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PACIFICORP
TECHNICAL SERVICES REPORT
CHARLES A. SEMBORSKI

CENTRAL ENGINEERING

ANNUAL HYDROLOGIC MONITORING REPORT
EAST/TRAIL MOUNTAIN PROPERTIES
1995

APRIL 30, 1996

PACIFICORP - FUEL RESOURCES
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 1995

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Prepared and submitted for PacifiCorp by:

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and

Energy West

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I. INTRODUCTION

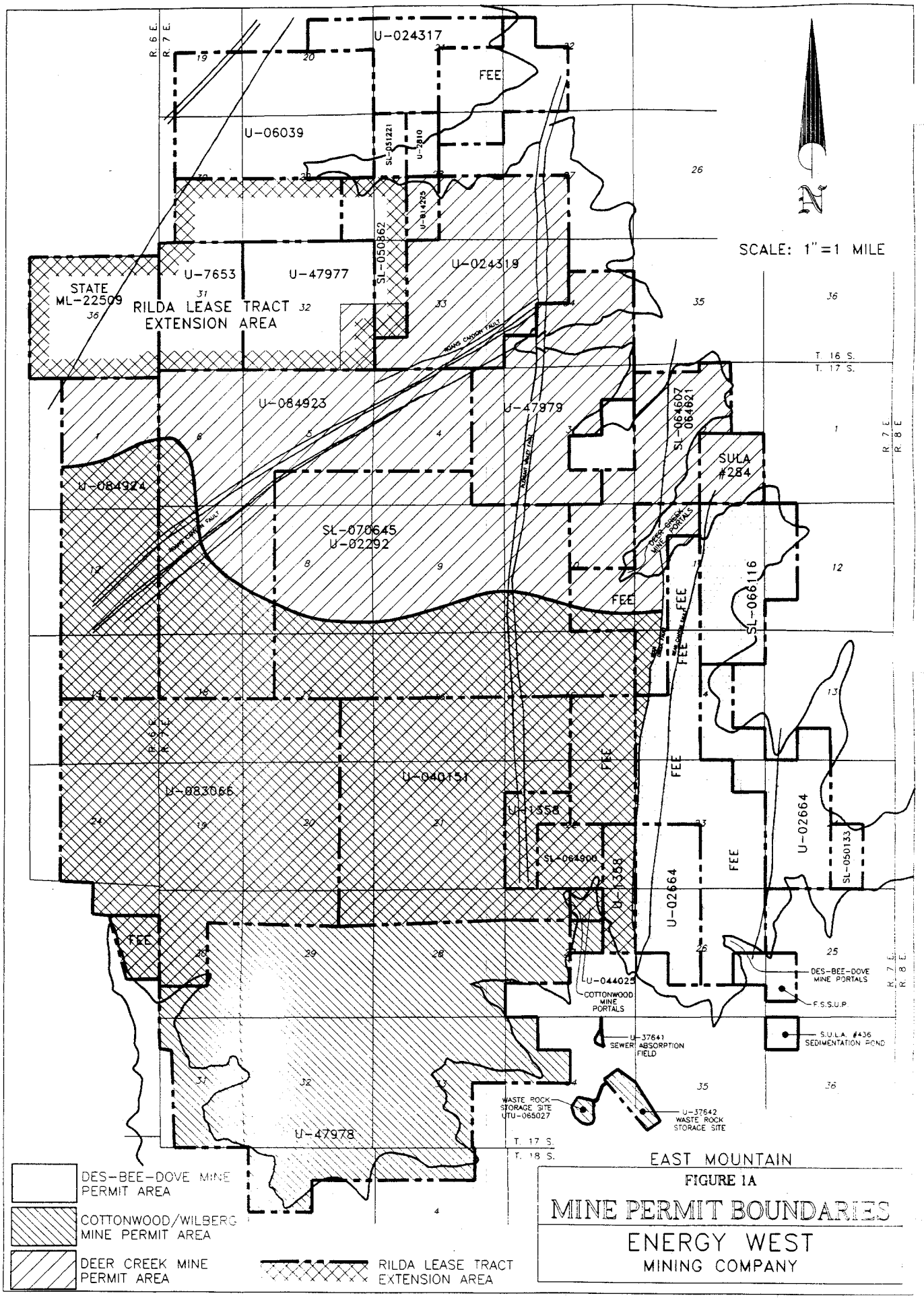
The 1995 Hydrologic Monitoring Report is hereby submitted in accordance with the U. S. Department of Interior, Office of Surface Mining requirements and the Utah State Division of Oil, Gas and Mining guidelines for hydrologic monitoring in areas of and adjacent to coal mining operations.

This is the eighteenth annual hydrologic report submitted by PacifiCorp since the report entitled "Monitoring of the Water Resources in the Mining Areas of East/Trail Mountain, Emery County, Utah" was submitted to the U. S. Geological Survey and the Utah Division of Oil, Gas and Mining in December 1977. It addresses flow observations and water quality characteristics of the water resources adjacent to PacifiCorp's mining areas in Emery County. (See Figure 1, A & B.)

Information was compiled the past year from in-house as well as from state and federal agencies and private sources as follow:

U. S. Geological Survey
U. S. Forest Service
U. S. Department of Commerce, National Weather Service
Utah Division of Oil, Gas and Mining
Utah Division of Environmental Health
Huntington-Cleveland Irrigation Company
Emery Water Conservancy District
Cottonwood Creek Consolidated Irrigation Company

Information from outside agencies will continue to be utilized each year for as long as their data gathering programs continue. As a result, cooperative effort is realized and duplication of effort and expense is substantially reduced.



EAST MOUNTAIN

FIGURE 1A

MINE PERMIT BOUNDARIES

ENERGY WEST
MINING COMPANY

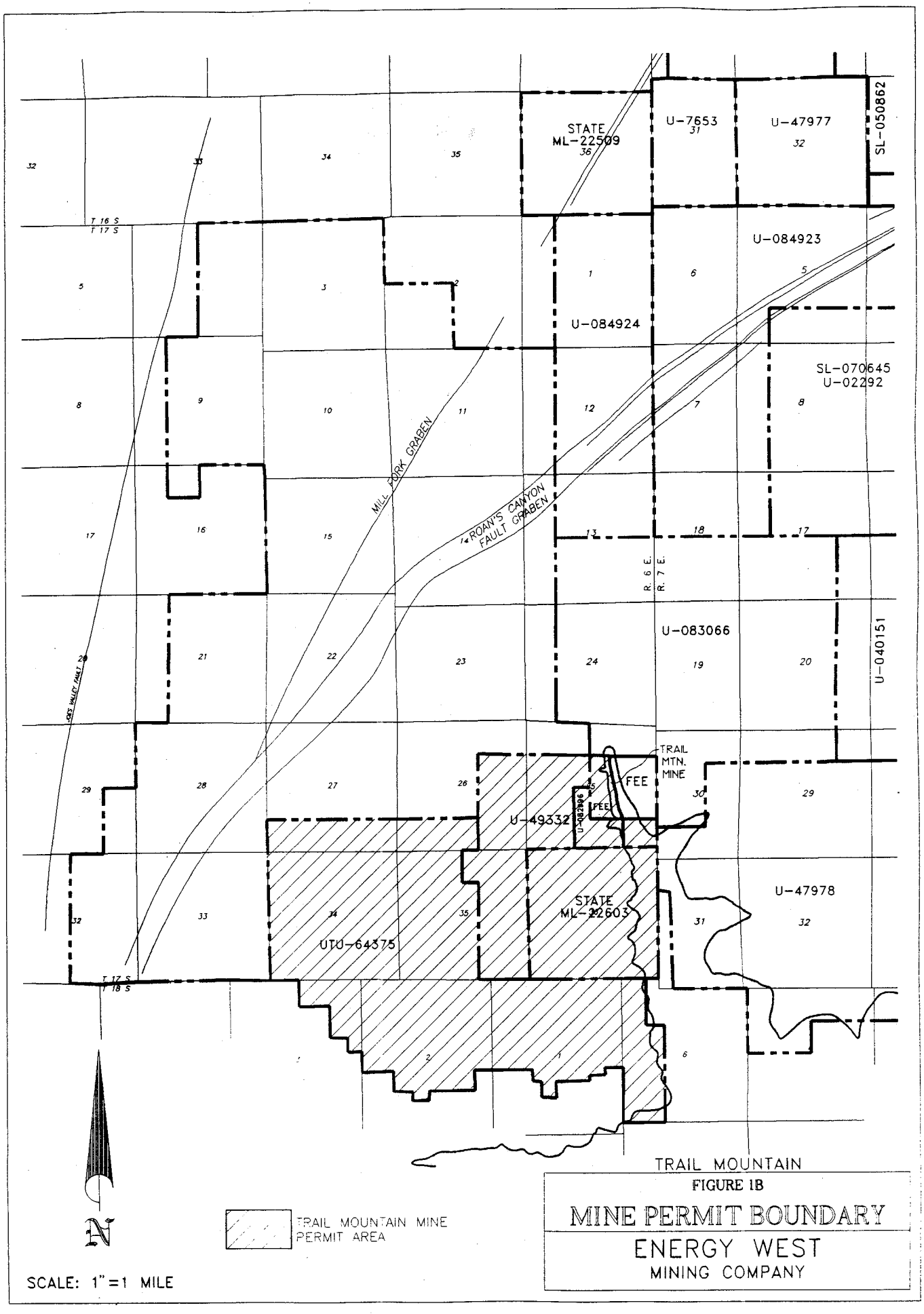


FIGURE 1B

MINE PERMIT BOUNDARY

ENERGY WEST MINING COMPANY

II. CLIMATIC OBSERVATIONS

In general, runoff and subsequent water supplies are a direct function of the climatic conditions in any given area. Furthermore, the significance of the weather affecting the flow characteristics of the East/Trail Mountain springs cannot be overemphasized.

Most of the water supply in the Western United States originates in the high mountain ranges as snowfall during winter periods. Snowmelt augmented by spring precipitation produces runoff which is utilized downstream. Fall precipitation influences soil moisture conditions prior to snowpack accumulation and has a bearing upon runoff the following year.

A. Regional Climatology

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The pattern changed in 1985 with conditions returning to slightly above normal. During the 1986 water year the extremely wet trend returned, and the upper Colorado River Basin experienced above average precipitation. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992 with runoff amounts much below normal for six consecutive years. 1993 runoff improved substantially with above average flow conditions occurring in most river basins. 1994 brought the return of drought conditions throughout the West. 1995 water supplies were much improved with above average runoff.

B. Local Climatology

1. Precipitation

Valley precipitation in Emery County during 1995 was variable. All stations in the San Rafael Basin received above normal snowfall during the 1994-95 winter.

Precipitation amounts recorded at Hunter Plant, Huntington Plant, Electric Lake, and East Mountain for the 1995 water year (October 1994 to September 1995) will be presented since these sites include low elevation, intermediate elevation, and two high elevation observation sites in the immediate vicinity of mining activities. The values are shown in Table 1 on the following page.

A comparison of precipitation for 1994 and 1995 merits consideration in this study. The intent is to develop a correlation between yearly precipitation and spring discharges on East and Trail mountains. Table 2 is a comparison of the 1994-1995 precipitation levels recorded at the four locations.

TABLE 2: COMPARISON OF 1994 AND 1995 PRECIPITATION (Inches)

Station	1994 Amount	1994 % of Normal	1995 Amount	1995 % of Normal	1995 As % of 1994
Hunter Plant	6.05	87	11.84	170	196
Huntington Plant	11.49	153	15.42	206	134
Electric Lake	18.51	95	33.78	172	182
East Mountain	11.33	83	16.46	119	145
Average %		105		167	164

Table 2 indicates that 1995 precipitation was higher than 1994 at all locations. The overall precipitation at the four stations averaged sixty-four percent (64%) higher in 1995 than in 1994.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (1995 Water Year)

	Hunter Plant (Elev. 5800')		Huntington Plant (Elev. 6500')		Electric Lake (Elev. 8350')		East Mountain (Elev. 8985')	
Month	Precip (in.)	% Of Normal	Precip (in.)	% Of Normal	Precip. (in.)	% Of Normal	Precip. (in.)	% of Normal
1994								
October	1.38	179	1.33	106	2.40	114	1.86	135
November	0.22	43	0.26	44	4.26	229	1.42	124
December	0.96	181	0.33	72	1.60	147	0.65	71
1995								
January	0.78	181	1.10	212	3.25	162	1.37	120
February	0.10	25	0.26	76	1.90	109	0.66	61
March	1.13	226	1.05	169	3.84	202	0.79	49
April	2.35	546	2.65	482	3.94	234	3.75	332
May	1.12	258	2.67	468	5.07	342	2.29	225
June	0.61	135	1.17	308	2.04	246	1.19	216
July	0.14	25	0.32	34	1.00	84	0.34	32
August	1.89	187	2.81	413	2.53	298	1.52	102
September	1.16	145	1.48	279	1.95	186	0.62	46
TOTALS	11.84	170	15.42	142	33.78	173	16.46	119
Mean Monthly	0.99	---	1.28	---	2.82	---	1.37	---

Tables 3, 4, 5, and 6 indicate monthly precipitation values at Hunter, Huntington, Electric Lake, and East Mountain from the beginning of operation at each site. The tables indicate monthly trends as well as the great fluctuation in yearly totals. Figure 2 shows monthly precipitation at the East Mountain site for the 1995 water year.

The correlation of precipitation levels with spring discharges will be discussed in the East/Trail Mountain Springs section of this report.

TABLE 3: HUNTER PLANT PRECIPITATION

Elevation - 5,800 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
75-76	0.13	0.25	0.19	0.02	0.40	0.00	0.89	0.84	0.03	0.31	0.08	0.70	3.84
76-77	0.00	0.02	0.00	0.37	0.07	0.00	0.03	1.28	0.07	1.35	0.41	0.50	4.10
77-78	0.01	0.18	0.00	1.28	1.05	1.74	0.34	1.21	0.00	0.69	1.14	0.14	7.78
78-79	0.03	2.22	0.22	1.43	0.53	2.43	0.24	0.47	0.00	0.00	0.79	0.00	8.36
79-80	0.00	0.00	0.41	1.70	1.70	0.67	0.75	1.11	0.00	0.02	0.51	2.06	8.93
80-81	0.66	0.06	0.02	0.00	0.07	1.48	0.16	0.45	0.14	0.20	0.70	2.43	6.37
81-82	0.58	0.27	0.45	0.94	0.45	0.54	0.00	0.02	0.00	0.15	1.06	1.23	5.69
82-83	0.20	1.25	0.45	0.54	0.41	0.84	0.37	0.51	0.00	2.18	1.58	0.88	9.21
83-84	0.53	0.66	1.07	0.03	0.35	0.34	0.34	0.05	1.09	1.80	1.89	2.35	10.50
84-85	1.6	0.06	1.24	0.20	0.95	1.01	0.67	0.64	0.26	1.50	0.03	0.86	9.11
85-86	0.92	1.40	0.42	0.10	0.97	0.40	0.31	0.00	0.31	0.55	1.01	0.57	7.05
86-87	0.92	0.08	0.10	0.32	0.45	0.90	0.12	1.38	1.25	1.65	1.27	0.11	8.55
87-88	1.91	1.02	0.66	0.55	0.00	0.66	1.64	0.59	0.20	0.69	0.44	0.78	9.14
88-89	0.69	0.04	0.48	1.23	0.02	0.23	0.00	0.37	0.14	1.01	1.70	0.35	6.26
89-90	0.20	0.00	0.03	0.31	0.72	0.71	0.51	0.06	0.24	0.56	0.38	1.11	4.73
90-91	0.04	0.00	0.19	0.02	0.29	0.77	0.10	1.09	0.58	0.94	0.53	2.11	6.66
91-92	0.17	0.50	0.14	1.04	2.72	0.87	0.22	1.56	0.34	0.22	1.60	0.52	9.90
92-93	0.81	0.07	0.78	1.44	1.67	1.18	0.50	0.92	0.15	0.05	0.93	0.05	8.55
93-94	1.54	0.51	0.08	Tr.	0.53	0.01	0.67	0.17	0.31	0.09	0.75	1.39	6.05
94-95	1.38	0.22	0.96	0.78	0.10	1.13	2.35	1.12	0.61	0.14	1.89	1.16	11.84

TABLE 4: HUNTINGTON PLANT PRECIPITATION

Elevation - 6,500 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
70-71	---	---	---	---	---	0.08	0.29	0.16	0.11	0.57	0.63	0.43	2.27
71-72	2.26	0.59	1.62	0.04	0.00	0.32	0.28	0.16	0.77	0.40	0.66	1.07	8.17
72-73	4.27	1.28	0.34	0.49	0.80	2.42	0.50	0.17	0.97	1.09	1.94	0.12	14.39
73-74	0.08	0.02	0.37	0.20	0.03	0.01	0.00	0.00	0.00	0.09	0.00	0.07	0.87
74-75	0.68	1.19	1.13	1.01	0.30	0.80	0.03	0.75	1.44	2.62	0.31	0.24	9.50
75-76	0.23	0.95	0.03	0.20	0.23	0.00	2.34	0.86	0.02	0.73	0.19	0.85	6.63
76-77	0.56	0.00	0.00	0.35	0.00	0.00	0.00	1.76	0.00	2.08	0.96	0.70	6.41
77-78	0.66	0.12	0.82	1.45	1.00	1.36	0.94	0.72	0.12	0.05	0.72	0.77	8.73
78-79	0.02	2.65	0.25	1.21	0.52	2.50	0.00	0.84	0.05	0.09	3.32	0.20	11.65
79-80	0.17	0.14	0.15	2.88	3.63	0.68	1.13	1.88	0.65	0.18	0.38	2.22	14.09
80-81	1.20	0.06	0.00	0.00	0.00	0.62	0.08	1.75	0.48	0.00	0.58	1.53	6.30
81-82	1.12	0.25	1.30	1.63	0.20	0.73	0.00	0.17	0.00	0.08	0.71	1.91	8.10
82-83	0.20	0.60	0.67	0.16	0.65	1.87	0.08	0.40	0.00	1.61	0.39	1.15	7.78
83-84	0.76	0.76	2.13	0.10	0.15	1.18	0.72	0.17	1.04	0.74	1.39	0.46	9.60
84-85	2.07	0.34	1.74	0.49	0.27	0.53	0.44	1.08	0.42	3.21	0.04	0.81	11.44
85-86	0.77	1.28	0.64	0.01	0.98	0.28	0.43	0.10	0.17	0.42	0.55	1.08	6.71
86-87	0.38	0.15	0.05	0.81	0.66	0.13	1.22	1.48	1.01	2.14	0.65	0.00	8.68
87-88	1.36	1.35	0.51	1.77	0.00	0.10	1.35	0.94	0.83	0.04	0.13	0.92	9.30
88-89	0.31	0.13	0.83	0.68	0.28	0.21	0.20	0.22	1.28	0.78	1.72	0.74	7.38
89-90	0.21	0.28	0.42	0.51	1.18	0.94	1.30	1.35	0.65	1.30	1.27	2.35	11.76
90-91	0.45	0.03	0.43	0.44	0.37	0.68	0.13	3.13	0.60	1.14	1.87	2.38	11.61
91-92	0.21	0.99	0.37	1.20	1.98	1.55	0.47	1.92	1.97	2.99	1.53	0.60	15.78
92-93	1.93	1.02	1.67	2.32	1.71	1.87	0.46	0.65	0.31	0.08	1.68	0.46	14.16
93-94	2.11	0.88	0.23	0.12	0.88	1.17	1.69	0.53	0.05	Tr.	2.14	1.69	11.49
94-95	1.33	0.26	0.33	1.10	0.26	1.05	2.65	2.67	1.17	0.32	2.81	1.48	15.42

TABLE 5: ELECTRIC LAKE PRECIPITATION

Elevation - 8,350 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
70-71	2.46	2.35	6.41	1.13	1.66	0.36	1.05	0.66	0.47	0.40	2.15	0.78	19.88
71-72	3.49	1.69	4.07	3.35	0.58	0.70	1.02	0.28	1.49	0.70	0.80	2.91	21.08
72-73	4.18	3.43	3.27	0.97	2.09	2.74	3.67	1.42	0.85	0.82	1.23	1.15	25.82
73-74	0.79	1.90	3.52	2.70	1.12	1.52	2.49	0.20	0.13	2.09	0.06	0.09	16.61
74-75	2.27	0.62	1.73	2.10	2.37	3.42	1.23	3.21	1.08	1.93	0.49	0.25	20.70
75-76	1.31	2.57	0.82	1.44	2.23	1.35	1.47	2.00	1.23	1.07	0.54	1.19	17.22
76-77	1.00	0.25	0.14	0.76	1.14	2.00	0.05	3.00	0.90	2.28	1.31	1.26	14.09
77-78	1.47	2.10	3.20	3.68	2.74	3.16	2.46	1.18	0.30	0.10	0.24	0.77	21.40
78-79	0.40	3.18	2.66	2.90	2.18	2.53	0.72	1.67	0.19	0.96	2.29	0.32	20.00
79-80	1.55	2.23	0.37	4.95	6.01	3.34	1.27	3.09	0.12	0.37	0.38	1.80	25.48
10-Year	1.892	2.032	2.619	2.398	2.212	2.112	1.543	1.671	0.666	1.072	0.949	1.052	20.218
80-81	1.45	0.98	0.32	1.30	1.04	3.20	1.45	3.06	0.39	1.61	2.73	1.44	18.97
81-82	4.18	1.44	4.79	5.26	1.66	5.06	1.11	1.40	0.59	1.26	2.29	5.38	34.42
82-83	1.88	3.68	2.76	2.41	4.00	4.30	2.35	2.81	1.35	1.34	1.50	2.88	31.26
83-84	2.15	4.81	7.43	1.27	1.56	2.77	3.23	1.73	3.41	2.55	2.26	1.47	34.64
84-85	2.92	2.63	3.24	1.54	1.09	3.54	1.95	1.19	0.89	3.04	0.03	4.35	26.41
85-86	4.40	6.62	1.99	1.81	8.54	2.48	3.79	1.62	0.26	1.01	1.68	2.73	36.93
86-87	1.86	1.98	0.55	2.14	2.07	2.47	1.03	2.93	0.79	2.12	1.22	0.49	19.65
87-88	1.39	1.68	3.50	3.06	0.72	3.32	2.14	1.60	0.86	1.04	2.23	1.16	22.70
88-89	1.20	2.68	1.91	1.52	1.99	3.55	0.35	0.06	1.54	1.43	[illegible]	1.19	18.79
89-90	1.21	1.88	0.70	2.00	4.06	2.30	2.00	0.81	1.87	1.08	[illegible]	1.87	20.40
90-91	1.32	0.90	1.64	1.49	1.64	4.24	3.06	2.60	0.57	1.04	1.39	2.70	22.56
91-92	1.43	2.10	0.87	0.72	2.21	1.95	0.54	1.55	1.01	0.59	1.64	1.02	15.63
92-93	1.51	1.33	3.60	5.01	4.76	2.25	2.49	2.40	1.57	0.48	1.32	0.60	27.32
93-94	2.10	2.19	0.90	1.00	4.00	1.10	2.81	0.99	0.10	0.25	0.75	2.32	18.51
94-95	2.40	4.26	1.60	3.25	1.90	3.84	3.94	5.07	2.04	1.00	2.53	1.95	33.78

NOTE: Climatic Station was moved from a point one mile above the dam site to a point 500 feet below dam site on November 15, 1973.

October, November, and December 70-71 were estimated by correlation with Clear Creek Weather Station.

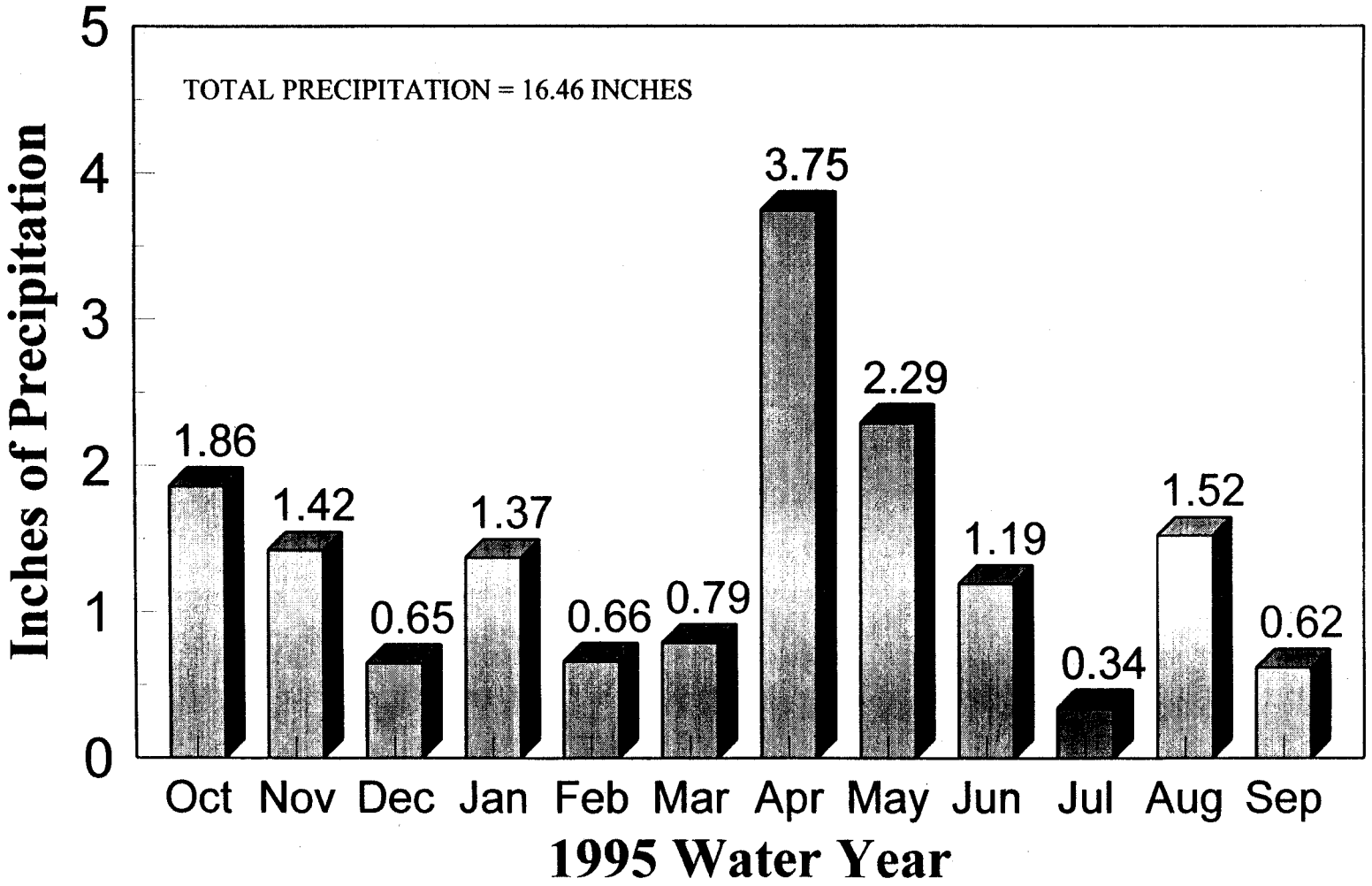
TABLE 6: EAST MOUNTAIN PRECIPITATION

Elevation - 8,985 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
80-81	1.28	0.39	0.05	0.29	0.52	2.77	0.64	0.87	0.11	0.57	0.85	2.55	10.90
81-82	1.93	0.53	0.97	3.22	0.14	1.67	0.00	0.45	0.09	1.86	1.10	2.61	14.57
82-83	0.38	2.90	1.39	1.30	1.81	1.98	0.92	0.71	0.61	1.27	4.83	1.62	19.71
83-84	0.76	2.43	2.42	0.27	0.65	1.22	0.50	0.22	1.18	1.90	2.33	0.64	14.53
84-85	3.27	0.97	1.67	0.49	0.59	1.77	1.35	1.73	0.28	2.47	0.12	2.31	17.02
85-86	1.15	2.38	0.87	0.30	2.10	1.43	1.05	0.38	0.53	0.87	2.24	1.63	14.92
86-87	1.57	0.39	0.16	1.37	1.37	1.65	1.16	1.77	0.58	2.49	1.16	0.06	13.73
87-88	2.77	1.91	1.29	1.42	0.00	0.99	2.08	1.03	0.81	0.45	0.96	0.91	14.61
88-89	0.61	0.43	1.56	1.00	0.68	1.03	0.26	0.47	0.43	1.19	2.44	0.49	10.59
89-90	0.28	0.39	0.16	0.74	2.08	1.75	1.03	0.26	0.67	0.88	1.03	1.62	10.90
10-Year	1.40	1.27	1.05	1.04	0.99	1.63	0.90	0.79	0.53	1.40	1.71	1.44	14.15
90-91	0.48	0.26	0.66	0.34	0.39	2.34	0.59	1.83	0.21	1.01	1.48	3.11	12.69
91-92	0.49	1.07	0.07	0.61	1.73	2.39	0.56	2.19	0.95	0.85	0.48	0.35	11.74
92-93	1.57	0.57	1.53	4.10	2.34	2.01	0.33	0.72	0.19	0.04	0.82	0.14	14.37
93-94	2.23	1.12	0.14	0.32	1.35	0.34	2.65	0.36	0.39	0.10	0.83	1.49	11.33
94-95	1.86	1.42	0.65	1.37	0.66	0.79	3.75	2.29	1.19	0.34	1.52	0.62	16.46

FIGURE 2

EAST MOUNTAIN PRECIPITATION
1995 WATER YEAR



2. Temperatures

During the 1995 water year temperatures were above normal at Hunter Plant and East Mountain and below normal at Huntington Plant and Electric Lake. Temperatures at the Hunter Plant station were above normal for all months except November. At the Huntington Plant station temperatures were below normal all months except for January through March and September. At the East Mountain station temperatures were above normal during October and December, while the rest of the year was below normal. Temperatures at the Electric Lake station fluctuated from below normal during the winter to much above normal during the summer. (See Table 7.)

A comparison of 1994 and 1995 temperatures for the four stations is addressed since temperatures also influence water supplies from year to year. Table 8 depicts the variation and compares 1994 to 1995.

TABLE 8: COMPARISON OF 1994 AND 1995 TEMPERATURES*

	1994		1995		1995
Station	Average Temp.	Departure From Normal	Average Temp.	Departure From Normal	Departure From 1993
Hunter Plant	51.3	+5.5	50.1	+4.2	-1.2
Huntington Plant	48.7	+1.1	46.0	-1.6	-2.7
Electric Lake	36.4	+2.5	33.6	-0.3	-2.8
East Mountain	41.2	+2.1	42.8	+3.4	+1.6
Average Departure From Normal		+2.8		+1.4	-1.3

* Temperatures reported in degrees Fahrenheit.

TABLE 7: TEMPERATURES IN EMERY COUNTY, UTAH (1995 Water Year)

	Hunter Plant		Huntington Plant		Electric Lake		East Mountain	
Month	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal	Average Temp.*	Departure From Normal
1994								
October	50.4	+2.0	46.2	-3.2	37.9	+0.4	39.4	+0.8
November	32.5	-2.7	28.4	-7.6	16.9	-8.8	23.2	-4.0
December	27.2	+0.5	25.2	-2.2	10.6	-5.2	23.3	+2.7
1995								
January	28.0	+3.9	25.1	+1.5	16.2	+1.6	23.0	+1.4
February	40.2	+11.8	37.6	+7.4	24.5	+5.2	34.7	+10.3
March	43.4	+7.6	37.8	+0.1	23.2	+2.4	31.6	+3.1
April	48.0	+3.4	43.1	-2.0	28.6	-0.1	39.8	+3.4
May	55.5	+3.4	49.4	-5.5	35.1	-3.9	45.9	+2.2
June	63.9	+2.5	59.2	-6.6	46.4	-2.2	56.5	+1.1
July	73.5	+5.1	69.3	-2.4	56.9	+1.2	67.4	+5.2
August	73.2	+6.8	68.8	-0.6	57.1	+3.3	68.5	+7.1
September	65.2	+13.3	62.0	+1.6	50.3	+2.8	59.6	+7.1
TOTALS	50.1	+4.8	46.0	-1.6	33.6	-0.3	42.8	+3.4

* Temperatures reported in degrees Fahrenheit.

III. DRAINAGE SYSTEMS

The surface drainage system on East Mountain is divided into two major drainages; the southwest portion forms part of the Cottonwood Creek drainage, and the northeast portion contributes to the Huntington Creek drainage. (See Map 1 in pocket.) The drainage boundaries, including minor subdivisions to Cottonwood and Huntington creeks, are designated on the accompanying map. The surface drainage system on Trail Mountain is totally contained within the Cottonwood Creek drainage system, with minor subdivisions flowing to Indian and Cottonwood Canyon creeks. (see Map 7 in pocket.) Both Huntington and Cottonwood creeks flow out of the Wasatch Plateau in a southeasterly direction. The creeks merge with Ferron Creek to form the San Rafael River, which is a tributary of the Green River.

A. Huntington Creek Drainage System

Huntington Creek is comprised of many smaller tributary streams that feed the main stream. Deer Creek, Meetinghouse Canyon, and Rilda Canyon creeks are the only tributaries to Huntington Creek that emanate from within PacifiCorp's coal mine permitted area.

1. Huntington Creek

Flow data are recorded on a continuous basis by Utah Power at two locations; one station is located near Utah Power's Huntington Plant, the other about 22 miles upstream from the Huntington Plant. Flow records are maintained by Utah Power in order to determine water entitlements and reservoir storage allocation for the various users on the river.

Table 9 shows a summary of actual Huntington Creek flows below Electric Lake and at Huntington Plant, and calculated natural flow at Huntington Plant. The calculated natural flow considers actual flow recorded at the plant, plant diversions, Electric Lake storage change, and lake evaporation. The average daily discharges for the 1995 water year (October 1994 - September 1995) at the two stations and Electric Lake storage are found in Appendix A.

TABLE 9: HUNTINGTON CREEK WATER FLOWS (1995 Water Year)

	Huntington Creek Below Electric Lake	Huntington Creek At Plant	Calc. Natural Flow at Plant
Total Yearly Flow (Acre Feet)	14,100	65,350	85,532
% of Normal	65	96	122
Mean Discharge in Cubic Feet Per Second (CFS)	19.5	90.3	
Maximum Discharge (CFS)	90	750	
Date of Maximum Discharge	9/20/95	6/29/95	
Minimum Discharge (CFS)	2.7	10.0	
Date of Minimum Discharge	6/6/95	11/22/95	

*Influenced by upstream storage in Electric Lake.

During the 1995 spring runoff period (April through July) 15,313 acre feet of water were impounded behind Electric Lake Dam. During spring runoff the impoundment reached its highest level on July 19. Total storage on that date amounted to 27,628 acre feet, which is 3,636 acre feet below full. Reservoir releases for fishery, irrigation, and Huntington Plant needs during the water year totaled 14,100 acre feet. The total flow of 65,350 acre feet recorded for Huntington Creek at the Huntington Plant is equal to 96% of average.

A comparison of runoff values from 1994 and 1995 is presented in Table 10.

TABLE 10: COMPARISON OF 1994 AND 1995 RUNOFF VALUES

	1994		1995		
	Amount	% Of Normal	Amount	% Of Normal	1995 as a % of 1994
Spring Runoff Stored in Electric Lake (Acre Feet)	3,714	36	15,313	148	412
Calculated Natural Flow at Plant (Acre Feet)	40,655	58	85,532	122	210

During 1995 water quality information on Huntington Creek near the Deer Creek confluence was compiled on a monthly basis. Locations of water quality sampling stations monitored by PacifiCorp-Energy West Mining Company are listed below (refer to Map 1).

a. HCC01 - Above Power Plant Bridge

b. HCC02 - Below Deer Creek Confluence

c. HCC04 - Below Bridge @ Research Farm Bridge+

+ Not listed on map due to scale.

Specific water quality constituents analyzed are shown in Tables 11, 12, and 13. Values are in milligrams per liter unless otherwise noted. Raw data can be found in Appendix A.

In general, the water shows a gradual increase in concentration of dissolved minerals as the flow proceeds down Huntington Canyon.

TABLE 11: HUNTINGTON CREEK WATER QUALITY *

HCC01 - ABOVE POWER PLANT

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS	SETTLEABLE
																		SOLIDS		
3-95	10.0	200	54.0	15.0	14.0	441	3.80	220	0.20	0.10	21.00	0.10	5.0	8.57	2.00	11.00	24.0	10.0	210	0.50
6-95	10.0	195	57.0	10.0	4.0	314	7.40	200	1.40	0.10	15.00	0.10	5.0	8.10	1.00	4.00	7.0	70.0	170	0.50
9-95	10.0	165	47.0	10.0	8.0	287	6.60	167	0.60	0.10	12.00	0.10	5.0	8.76	1.00	6.00	14.0	35.0	190	0.50
12-95	10.0	255	55.0	5.0	10.0	400	9.20	228	0.10	0.10	22.00	0.10	5.0	8.81	1.00	8.00	29.0	5.0	260	0.50
1995																				
MIN	10.0	165	47.0	5.0	4.0	287	3.80	167	0.10	0.10	12.00	0.10	5.0	8.10	1.00	4.00	7.0	5.0	170	0.50
MAX	10.0	255	57.0	15.0	14.0	441	9.20	228	1.40	0.10	22.00	0.10	5.0	8.81	2.00	11.00	29.0	70.0	260	0.50
MEAN	10.0	204	53.3	10.0	9.0	360.5	6.75	203.75	0.58	0.10	17.50	0.10	5.0	8.56	1.25	7.25	18.5	30.0	208	0.50
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	173	40.0	1.0	2.0	310	6.2	149	0.10	0.20	11.00	0.10	5.0	8.17	1.00	3.00	2.0	4.0	170	0.50
MAX	10.0	249	57.0	5.0	30.0	484	9.9	235	0.20	0.60	23.00	0.20	7.0	8.88	5.00	11.00	40.0	40.0	280	0.50
MEAN	10.0	211	50.6	2.0	10.6	379	7.8	193	0.19	0.28	16.42	0.14	5.3	8.60	3.00	6.17	19.7	15.9	224	0.50
1993																				
MIN	0.0	159	32.7	0.0	1.0	309	4.3	118	0.05	0.10	9.00	0.00	0.0	7.80	0.00	1.00	3.0	6.0	164	0.50
MAX	3.0	253	76.4	6.0	20.0	640	10.5	275	0.25	1.95	25.60	0.20	5.0	9.17	2.00	19.60	60.0	95.0	330	0.70
MEAN	0.6	210	51.6	1.2	9.7	410	7.1	202	0.14	0.54	17.82	0.60	1.2	8.42	0.71	7.65	26.0	25.9	228	0.33
1992																				
MIN	0.1	189	40.3	0.1	10.0	309	5.8	177	0.01	0.01	11.30	0.01	0.1	8.01	0.01	1.24	5.0	1.0	134	0.01
MAX	17.0	281	80.7	6.0	25.0	475	10.1	289	0.10	0.25	30.00	0.07	3.7	8.90	3.12	23.00	70.0	25.0	269	--
MEAN	2.1	224	60.9	2.4	13.8	385	8.1	234	0.03	0.09	19.80	0.02	0.9	8.58	0.54	8.09	33.7	9.3	210	0.01
1991																				
MIN	1.0	183	46.7	0.0	0.0	210	7.1	189	0.00	0.00	12.30	0.00	0.0	7.1	0.00	1.20	17.0	0.0	170	0.00
MAX	25.0	288	77.9	11.0	45.0	460	10.5	288	0.20	0.33	35.50	0.06	3.9	8.4	4.52	9.03	80.0	85.0	369	0.50
MEAN	4.8	227	64.9	1.9	21.5	341	8.6	245	0.06	0.14	20.03	0.03	1.2	8.1	0.91	4.57	36.8	17.7	243	0.40
HISTORICAL 1991-1994																				
MIN	0.1	159	32.7	0.1	1.0	210	5.7	118	0.01	0.01	9.00	0.01	0.1	7.10	0.01	1.00	2.0	1.00	134	0.0
MAX	25.0	400	102.6	6.0	45.0	640	10.5	392	1.95	0.25	44.70	0.20	7.0	8.90	5.00	55.00	130.0	95.00	369	1.0
MEAN	4.0	228	60.0	1.6	15.2	388	8.1	229	0.20	0.09	19.34	0.06	2.2	8.36	1.35	8.10	33.1	14.30	232	0.4
No. of Analysis	53	55	55	49	54	65	65	55	51	54	55	52	48	65	48	55	55	64	65	58

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 12: HUNTINGTON CREEK WATER QUALITY *

HCC02 - @ POWER PLANT (BELOW DEER CREEK CONFLUENCE)

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS (SOLIDS)	TDS (SOLIDS)	SETTLEABLE SOLIDS (SOLIDS)
3-95	10.0	205	57.0	15.0	14.0	442	3.80	230	0.20	0.10	20.00	0.10	5.0	8.51	2.00	11.00	26.0	10.0	190	0.50
6-95	10.0	190	64.0	10.0	4.0	317	7.40	230	1.60	0.10	16.00	1.00	5.0	7.97	1.00	4.00	10.0	100.0	180	0.50
9-95	10.0	160	46.0	10.0	9.0	283	6.70	164	0.60	0.10	12.00	0.10	5.0	8.62	1.00	5.00	15.0	30.0	210	0.50
12-95	10.0	250	55.0	5.0	11.0	386	7.80	228	0.10	0.10	22.00	0.10	5.0	8.89	2.00	9.00	31.0	20.0	260	0.50
1995																				
MIN	10.0	160	46.0	5.0	4.0	283	3.80	164	0.10	0.10	12.00	0.10	5.0	7.97	1.00	4.00	10.0	10.0	180	0.50
MAX	10.0	250	64.0	15.0	14.0	442	7.80	230	1.60	0.10	22.00	1.00	5.0	8.89	2.00	11.00	31.0	100.0	260	0.50
MEAN	10.0	201	55.5	10.0	9.5	357	6.43	213	0.63	0.10	17.50	0.33	5.0	8.50	1.50	7.25	20.5	40.0	210	0.50
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	176	46.0	1.0	1.0	313	5.0	156	0.10	0.20	10.00	0.10	5.0	8.30	5.00	3.00	10.0	4.0	167	0.50
MAX	10.0	250	58.0	5.0	12.0	490	9.9	240	0.20	0.50	23.00	0.20	5.0	8.98	10.00	12.00	50.0	30.0	290	0.50
MEAN	10.0	212	52.5	2.1	6.7	386	7.5	200	0.19	0.25	16.58	0.14	5.0	8.62	3.36	6.50	23.3	13.5	221	0.50
1993																				
MIN	0.0	151	32.0	0.0	1.3	413	3.1	129	0.05	0.11	8.00	0.00	0.0	8.24	0.00	3.40	4.0	8.0	161	0.00
MAX	1.0	250	78.1	6.0	35.0	535	8.2	288	0.20	2.00	28.00	0.20	5.0	8.96	4.00	23.00	50.0	98.0	361	0.60
MEAN	0.1	206	53.8	1.4	13.3	418	5.9	209	0.11	0.40	18.23	0.07	1.1	8.67	1.08	11.10	28.4	25.8	254	0.30
1992																				
MIN	0.1	195	40.1	0.1	10.0	328	4.9	183	0.01	0.01	8.40	0.01	0.1	7.89	0.01	1.52	14.0	2.0	185	0.01
MAX	33.0	285	82.9	7.0	25.0	604	9.8	334	0.19	0.25	35.30	0.07	2.7	8.97	3.42	21.85	90.0	28.0	371	--
MEAN	4.5	239	63.2	2.1	17.5	456	7.8	255	0.05	0.09	23.54	0.02	0.6	8.64	0.97	11.25	45.6	12.1	252	0.01
1991																				
MIN	0.0	183	49.1	0.0	10.0	210	5.8	179	0.00	0.00	13.76	0.00	0.0	7.5	0.00	2.00	15.0	3.0	174	0.00
MAX	14.0	300	83.1	1.0	45.0	700	10.3	353	0.21	0.32	35.30	0.70	5.1	8.5	4.90	22.94	130.0	77.0	425	0.50
MEAN	2.1	233	69.6	0.8	25.0	406	8.4	263	0.04	0.13	21.55	0.02	1.5	8.1	1.31	10.00	55.0	19.6	278	0.39
HISTORICAL 1991-1994																				
MIN	0.1	151	32.0	0.1	1.0	210	4.8	129	0.01	0.01	8.00	0.01	0.1	7.14	0.01	1.52	4.0	1.00	161	0.0
MAX	33.0	310	91.7	7.0	45.0	700	10.3	365	2.00	0.21	39.90	0.20	5.1	8.98	5.00	23.00	150.0	98.00	425	1.0
MEAN	4.5	230	62.6	1.6	16.2	429	7.9	243	0.22	0.09	21.15	0.06	2.2	8.38	1.74	9.90	44.8	15.00	264	0.4
No. of Analysis	51	54	54	49	53	64	64	54	51	53	54	50	49	64	46	54	54	64	64	57

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 13: HUNTINGTON CREEK WATER QUALITY *

HCC04 - @ REASEARCH FARM

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	200	55.0	15.0	18.0	480	4.20	230	0.10	0.10	23.00	0.10	5.0	8.69	2.00	14.00	44.0	5.0	220	0.50
6-95	10.0	185	65.0	15.0	6.0	311	7.30	230	1.70	0.10	16.00	0.10	5.0	7.90	1.00	3.00	15.0	95.0	180	0.50
9-95	10.0	165	49.0	10.0	10.0	346	7.30	176	0.60	0.10	13.00	0.10	5.0	8.59	1.00	7.00	18.0	30.0	190	0.50
12-95	10.0	250	61.0	5.0	21.0	500	8.50	264	0.10	0.10	27.00	0.10	5.0	8.68	1.00	17.00	71.0	10.0	330	0.50
1995																				
MIN	10.0	165	49.0	5.0	6.0	311	4.20	176	0.10	0.10	13.00	0.10	5.0	7.90	1.00	3.00	15.0	5.0	180	0.50
MAX	10.0	250	65.0	15.0	21.0	500	8.50	264	1.70	0.10	27.00	0.10	5.0	8.69	2.00	17.00	71.0	95.0	330	0.50
MEAN	10.0	200	57.5	11.3	13.8	409.25	6.83	225	0.63	0.10	19.75	0.10	5.0	8.47	1.25	10.25	37.0	35.0	230	0.50
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	176	40.0	1.0	2.0	324	5.2	150	0.10	0.10	11.00	0.10	5.0	8.11	2.00	4.00	13.0	7.0	180	0.50
MAX	10.0	250	64.0	5.0	30.0	610	9.6	275	0.20	0.80	28.00	0.20	5.0	8.94	5.00	21.00	80.0	33.0	360	0.50
MEAN	10.0	213	54.0	2.1	11.7	432	7.6	213	0.19	0.29	19.00	0.14	5.0	8.61	3.25	9.92	34.5	16.0	255	0.50
1993																				
MIN	0.0	130	35.3	0.0	8.5	297	2.2	149	0.05	0.14	9.90	0.00	0.0	7.82	0.00	4.60	17.0	0.0	170	0.00
MAX	6.0	269	82.3	6.0	61.2	729	7.6	310	0.37	2.46	33.00	0.20	5.0	8.97	5.00	58.60	110.0	80.0	436	0.70
MEAN	0.9	214	57.0	1.8	21.3	462	5.4	235	0.14	0.89	22.67	0.05	0.7	8.66	1.03	16.64	55.8	26.1	285	0.33
1992																				
MIN	0.1	201	42.4	0.1	10.0	354	4.3	194	0.01	0.01	12.80	0.01	0.1	7.35	0.01	3.96	19.0	1.0	197	0.01
MAX	25.0	326	92.0	10.0	30.0	762	9.6	397	0.19	1.12	41.80	0.08	2.8	8.89	3.59	22.35	170.0	37.0	469	---
MEAN	4.0	250	67.2	2.2	19.6	516	7.5	276	0.06	0.18	26.19	0.02	0.6	8.51	0.97	16.61	78.3	15.0	298	0.01
1991																				
MIN	0.0	187	40.6	0.0	10.0	220	6.6	163	0.00	0.00	13.70	0.00	0.0	7.70	0.00	3.79	17.0	2.0	182	0.00
MAX	8.0	317	88.3	1.0	45.0	640	10.0	393	0.15	10.00	42.00	0.08	1.8	8.50	4.70	28.78	170.0	82.0	469	0.50
MEAN	1.6	233	71.2	0.8	25.4	410	8.1	278	0.04	0.94	24.43	0.02	0.8	8.20	1.20	12.78	70.8	22.7	309	0.39
HISTORICAL 1991-1994																				
MIN	0.1	130	35.3	0.1	2.0	220	4.3	149	0.01	0.01	9.90	0.01	0.1	7.35	0.01	3.79	13.0	1.00	170	0.0
MAX	25.0	326	108.1	10.0	61.2	762	10.0	397	2.46	0.37	42.00	0.20	5.0	8.94	10.70	58.60	170.0	82.00	469	1.0
MEAN	3.8	235	64.5	1.7	19.0	460	7.8	258	0.28	0.10	23.54	0.05	2.1	8.40	1.88	13.69	62.7	16.80	296	0.4
No. of Analysis	51	54	54	49	54	64	64	54	50	52	54	50	43	64	48	54	54	63	64	57

* Quality parameters are reported as mg/l unless otherwise noted.

2. Deer Creek

Deer Creek is an ephemeral tributary of Huntington Creek and flows from the same canyon in which the Deer Creek Mine is located. PacifiCorp monitors the characteristics of Deer Creek according to the following flow and sampling schedule (see Hydrologic Monitoring Schedule Appendix Q).

a. Flow and Sampling Schedule

(1) Locations:
(a) Above the Mine - DCR01
(b) @ Permit Boundary - DCR04
(c) Below the Mine - DCR06
(See Map No. 1 in pocket)

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1996; i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed in conjunction with quality measurements. Quantity will be monitored monthly.

b. Flow Information

As stated above, flow information is collected monthly throughout the year with the use of two Parshall flumes. (See Map No. 1 for flume locations.) A hydrograph showing all the data collected for 1995 and 1990-1994 has been generated for each location. (See Appendix B.) The hydrographs show that the flow in the Deer Creek drainage occurred from May through October with the peak flow occurring in June at all locations (DCR01 - 419 GPM, DCR04 - 480 GPM, DCR06 - 450 GPM).

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. The results of the historical operational quality analysis are listed in Tables 14 and 15. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. It is apparent from historical information in the tables that the quality of the Deer Creek runoff degradates slightly from the upper to the lower sampling point. The quality of the lower sampling point is thought to be affected by the Mancos Shale which outcrops above the lower sampling location.

3. Meetinghouse Canyon Creek

Meetinghouse Canyon Creek is an ephemeral tributary of Huntington Creek and is monitored according to the following schedule (see Hydrologic Monitoring Schedule in Appendix Q).

a. Flow and Sampling Schedule

(1) Location: South Fork of Meetinghouse Canyon (See Map No. 1 in pocket.)

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1996, i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed monthly in conjunction with quality measurements. Quantity will be monitored monthly.

TABLE 14: DEER CREEK SURFACE WATER QUALITY *

DCR01 - ABOVE THE MINE

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
6-95	10.0	280	56.0	15.0	6.0	503	4.90	240	0.10	0.10	25.00	0.10	5.0	7.44	1.00	27.00	26.0	25.0	250	0.50
9-95	10.0	280	50.0	15.0	8.0	530	7.90	269	0.10	0.10	35.00	0.10	5.0	8.81	1.00	43.00	52.0	5.0	360	---
1995																				
MIN	10.0	280	50.0	15.0	6.0	503	4.90	240	0.10	0.10	25.00	0.10	5.0	7.44	1.00	27.00	26.0	5.0	250	0.50
MAX	10.0	280	56.0	15.0	8.0	530	7.90	269	0.10	0.10	35.00	0.10	5.0	8.81	1.00	43.00	52.0	25.0	360	0.50
MEAN	10.0	280	53.0	15.0	7.0	516.5	6.40	254.5	0.10	0.10	30.00	0.10	5.0	8.13	1.00	35.00	39.0	15.0	305	0.50
Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
1994																				
MIN	No samples taken in 1994 - No flow.																			
MAX																				
MEAN																				
1993																				
MIN	0.0	241	36.0	0.0	5.6	484	7.2	193	0.05	0.07	19.30	0.03	0.0	8.26	0.94	20.00	36.0	1.0	284	0.50
MAX	2.0	373	94.2	9.0	9.0	580	22.0	343	0.35	8.10	37.00	0.20	1.3	8.73	2.20	45.70	100.0	31.0	377	1.30
MEAN	0.3	307	58.9	1.0	7.6	528	11.2	263	0.18	1.52	28.28	0.08	0.3	8.61	1.59	30.28	54.5	13.0	333	0.60
1992																				
MIN	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	2.0	325	0.00
MAX	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	2.0	325	0.00
MEAN	0.0	335	59.3	0.0	20.0	540	9.1	267	0.00	0.00	29.00	0.10	1.2	8.80	0.00	42.95	43.0	2.0	325	0.00
1991																				
MIN	No flow 1991 back to 1989																			
MAX																				
MEAN																				
HISTORICAL 1978-1994																				
MIN	0.1	241	2.2	0.1	3.5	360	5.3	193	0.01	0.01	19.30	0.01	0.1	6.97	0.01	13.40	10.0	0.50	231	0.0
MAX	137.0	397	107.2	9.0	176.0	1580	10.2	599	40.10	0.35	83.90	0.24	2.6	8.71	4.33	111.60	255.0	3592.00	897	1.3
MEAN	11.3	310	59.5	1.8	23.8	597	8.2	305	0.86	0.08	37.20	0.03	0.9	7.94	1.29	30.32	68.9	102.90	350	0.3
No. of Analysis	26	26	26	23	27	66	27	26	67	19	26	65	24	67	25	26	28	67	67	25

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 15: DEER CREEK SURFACE WATER QUALITY *

DCR06 - BELOW THE MINE

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNES	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS	SETTLEABLE
																....SOLIDS....				
6-95	10.0	250	66.0	25.0	111.0	936	4.00	330	0.30	0.20	41.00	0.10	5.0	8.12	2.00	79.00	70.0	30.0	490	
9-95	10.0	255	66.0	20.0	279.0	1270	7.20	400	0.10	0.10	57.00	0.10	5.0	8.74	3.00	199.00	120.0	5.0	900	
1995																				
MIN	10.0	250	66.0	20.0	111.0	936	4.00	330	0.10	0.10	41.00	0.10	5.0	8.12	2.00	79.00	70.0	5.0	490	
MAX	10.0	255	66.0	25.0	279.0	1270	7.20	400	0.30	0.20	57.00	0.10	5.0	8.74	3.00	199.00	120.0	30.0	900	
MEAN	10.0	253	66.0	22.5	195.0	1103	5.60	365	0.20	0.15	49.00	0.10	5.0	8.43	2.50	139.00	95.0	17.5	695	
Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0
1994																				
MIN	No samples taken in 1994 - No flow.																			
MAX																				
MEAN																				
1993																				
MIN	0.0	274	38.2	0.0	35.4	724	4.6	260	0.04	0.06	34.00	0.00	0.0	7.75	2.20	34.00	90.0	1.0	413	0.00
MAX	1.0	431	95.3	9.0	205.0	1360	10.2	483	0.30	2.70	65.00	0.10	5.0	8.81	10.30	138.00	190.0	200.0	862	1.00
MEAN	0.1	315	68.3	2.5	85.8	961	6.8	375	0.14	0.46	49.61	0.04	1.0	8.43	4.94	68.91	161.8	30.7	620	0.36
1992																				
MIN	0.1	162	46.1	0.1	20.0	692	5.9	313	0.01	0.01	41.20	0.01	0.1	7.80	2.53	28.19	78.0	3.0	446	0.01
MAX	28.0	356	129.8	6.0	60.0	1340	9.8	703	0.23	0.57	91.90	0.09	1.7	8.94	9.23	77.76	600.0	97.0	1001	0.80
MEAN	6.2	296	82.1	0.9	39.6	889	7.9	429	0.04	0.08	54.41	0.02	0.7	8.56	6.09	50.08	219.0	26.3	581	0.08
1991																				
MIN	<1.0	268	53.5	0.0	25.0	520	5.9	278	0.00	0.00	27.14	0.00	0.0	7.40	2.29	28.13	80.0	2.0	304	0.00
MAX	60.0	456	105.1	6.0	90.0	890	10.8	503	0.25	0.34	62.50	0.05	3.7	8.50	7.36	71.40	230.0	59.0	741	0.50
MEAN	7.3	316	84.2	1.6	43.5	696	8.0	407	0.06	0.12	47.68	0.02	1.5	8.20	4.74	43.52	170.0	23.8	517	0.40
HISTORICAL 1978-1994																				
MIN	0.1	162	2.4	0.1	5.0	420	5.4	260	0.01	0.01	27.14	0.01	0.1	6.92	1.00	28.13	65.0	0.50	273	0.0
MAX	90.0	456	191.9	11.0	515.0	2400	11.0	990	170.00	1.22	124.00	0.27	9.0	8.94	10.30	272.80	610.0	20540.00	1544	2.3
MEAN	6.2	317	85.0	1.7	78.7	992	7.8	448	2.07	0.12	55.62	0.03	1.3	8.16	4.85	70.40	201.2	243.80	623	0.4
No. of Analysis	59	61	61	57	62	107	72	61	96	51	61	92	56	108	61	61	63	107	108	62

*** Quality parameters are reported as mg/l unless otherwise noted.**

b. Flow Information

A hydrograph comparing 1995 and 1990-1994 can be found in Appendix C. Peak flow occurred during the month of June at a rate of 1821 GPM. Base flow of 0.0 GPM existed during the months January through May, November,and December.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. Quality sampling was initiated in 1986. Table 16 lists the minimum, maximum, and mean values for 1991-1995 along with historical results.

4. Rilda Canyon Creek

Rilda Canyon Creek is a tributary of Huntington Creek and is monitored according to the following schedule (see Appendix Q). Rilda Canyon Creek is ephemeral from its headwaters to the western border of Section 28, Township 16 South, Range 7 East, and perennial from that point to the confluence of Huntington Creek.

a. Flow and Sampling Schedule

(1) Locations:
- (a) Right Fork of Rilda - RCF1
- (b) Left Fork of Rilda - RCLF1*
- (c) Rilda Canyon - RCF2*
- (d) Rilda Canyon - RCF3
- (e) Rilda Canyon - RCW4 (See Map 1.)

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in June 1989

TABLE 16: MEETINGHOUSE CANYON WATER QUALITY *

MHC01 - LEFT FORK

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS (SOLIDS)	TDS (SOLIDS)	SETTLEABLE (SOLIDS)
6-95	10.0	230	53.0	15.0	4.0	399	4.60	220	0.10	0.10	21.00	0.10	5.0	8.55	1.00	9.00	14.0	15.0	190	0.50
10-95	40.0	240	46.0	10.0	5.0	402	8.50	234	0.10	0.10	29.00	0.10	5.0	8.75	1.00	9.00	28.0	10.0	200	0.50
1995																				
MIN	10.0	230	46.0	10.0	4.0	399	4.60	220	0.10	0.10	21.00	0.10	5.0	8.55	1.00	9.00	14.0	10.0	190	0.5
MAX	40.0	240	53.0	15.0	5.0	402	8.50	234	0.10	0.10	29.00	0.10	5.0	8.75	1.00	9.00	28.0	15.0	200	0.5
MEAN	25.0	235	49.5	12.5	4.5	400.5	6.55	227	0.10	0.10	25.00	0.10	5.0	8.65	1.00	9.00	21.0	12.5	195	0.5
Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1994																				
MIN	No samples taken in 1994 - No flow.																			
MAX																				
MEAN																				
1993																				
MIN	0.0	254	39.0	0.0	4.6	394	4.4	217	<0.05	0.10	18.90	<0.03	0.0	8.30	<0.10	4.80	14.0	9.0	219	<0.5
MAX	0.0	256	65.8	<1.0	5.0	395	7.5	242	0.07	0.27	29.00	<0.03	0.1	8.80	<0.10	14.00	26.0	32.0	271	<0.5
MEAN	0.0	255	52.4	0.5	4.8	395	5.9	229	0.06	0.18	23.90	<0.03	0.1	8.50	<0.10	9.40	20.0	20.5	245	<0.5
1992																				
MIN	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.10	0.05	1.2	8.80	0.00	5.40	12.0	30.0	183	0.00
MAX	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.10	0.05	1.2	8.80	0.00	5.40	12.0	30.0	183	0.00
MEAN	0.0	195	33.7	0.0	15.0	344	5.1	175	0.21	0.28	22.10	0.05	1.2	8.80	0.00	5.40	12.0	30.0	183	0.00
1991																				
MIN	<1.0	232	66.6	<1.0	10.0	300	6.4	237	<0.02	<0.02	17.20	0.03	<0.1	8.30	<0.02	4.00	8.0	49.0	197	<0.5
MAX	<1.0	272	80.4	<1.0	25.0	300	6.8	316	0.10	0.21	28.00	0.08	2.0	8.40	0.28	6.70	18.0	175.0	238	<0.5
MEAN	<1.0	252	66.6	<1.0	17.5	300	6.6	277	0.06	0.11	22.60	0.06	1.1	8.40	0.15	5.40	13.0	112.0	218	<0.5
HISTORICAL 1986-1994																				
MIN	0.1	195	2.2	0.1	3.0	300	4.4	175	0.02	0.01	17.20	0.01	0.1	7.25	0.01	3.80	8.0	0.10	183	0.0
MAX	49.0	307	80.4	8.0	47.5	500	10.3	350	0.90	0.30	36.50	0.08	10.9	8.81	1.62	14.00	100.0	175.00	304	1.0
MEAN	5.1	246	47.0	1.7	9.7	401	7.4	243	0.17	0.09	27.62	0.02	1.3	8.02	0.90	8.52	36.7	31.20	244	0.2
No. of Analysis	17	19	19	18	19	19	19	19	19	19	19	19	18	19	19	19	19	18	19	18

* Quality parameters are reported as mg/l unless otherwise noted.

except for RCL1, which was initiated in 1990 and will continue through 1996 on a quarterly basis, i.e., March, June, September, December. Field measurements, including pH, specific conductivity, temperature, and dissolved oxygen, will be performed at the perennial stream locations, i.e., RCF3 and RCW4, monthly in conjunction with quality measurements. Quantity will be monitored monthly.

* Flow and field parameters only.

b. Flow Information

Flow information is collected monthly throughout the year with the use of three Parshall flumes and one V-notch weir. (See Map 1 for locations.) A hydrograph has been generated for each flume-weir location. (See Appendix D.) Springs utilized by North Emery Water Users Association (NEWUA) for culinary purposes are situated between monitoring locations RCF2 and RCF3. Flow above the spring area is ephemeral and below the stream is perennial. For location RCF1 flow occurred from June through October with a peak flow estimated at 4,500 in June, decreasing to 200 GPM in October. Location RCF1 was inaccessible from January through May and November and December. Flow at location RCLF1 occurred during the months June through August with a peak flow estimated at 400 GPM. For location RCF2 flow occurred during the months of May and October, with peak flow estimated at 4,500 GPM in June and a base flow of 0.0 GPM during the months of January through April and November and December. Below the spring area the stream is perennial and increases in flow from RCF3 to RCW4. During 1995 the peak flow for RCF3 was estimated at 4,500 GPM (June), for RCW4, 4,500 GPM (June). Baseline flow for 1995 at RCF3 and RCW4 was approximately 25 and 149 GPM, respectively. Data suggest that above the NEWUA springs the stream loses water to the alluvium and below the spring area the alluvium recharges the stream causing the flow to increase.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis will be for a two-year period, 1989-90. Thereafter, baseline analysis will be repeated once every five (5) years. Quality sampling was initiated in 1989; results of the samples collected are presented in Tables 17, 18, and 19. It is apparent from the data that the quality of the water degradates from the upper reaches of Rilda Canyon, i.e., RCF1, to the NEWUA spring area, and from that point to the mouth of the canyon, i.e., RCW4, the water quality is relatively consistent. (See Tables 17, 18, and 19.)

B. Cottonwood Creek Drainage System

The southern portion of East Mountain and the entire Trail Mountain is intersected by Cottonwood Creek and its associated tributaries, including Cottonwood Canyon Creek and Grimes Wash. The Cottonwood Creek drainage is about equal in size to the Huntington drainage, with total discharge from each drainage about 70,000 acre feet per year. The major cultural feature on Cottonwood Creek is Joe's Valley Reservoir, located about twelve miles west of the town of Orangeville. The 63,000 acre foot reservoir was constructed by the U. S. Bureau of Reclamation and provides storage water for irrigation, industrial, and municipal needs in the Emery County area.

PacifiCorp monitors two of the tributaries of the Cottonwood Creek drainage system, Cottonwood Canyon Creek and Grimes Wash. (See Map 1 in pocket.)

TABLE 17: RILDA CANYON SURFACE WATER QUALITY *

RCF1 - RILDA CANYON FLUME - RIGHT FORK

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS	SOLIDS SETTLEABLE
6-95	10.0	260	83.0	20.0	4.0	423	4.80	290	2.50	1.20	21.00	0.10	5.0	7.78	1.00	6.00	15.0	240.0	220	0.50
9-95	10.0	245	60.0	10.0	5.0	384	6.90	270	1.50	0.10	30.00	0.10	5.0	8.70	2.00	24.00	47.0	120.0	270	0.50
1995																				
MIN	10.0	245	60.0	10.0	4.0	384	4.80	270	1.50	0.10	21.00	0.10	5.0	7.78	1.00	6.00	15.0	120.0	220	0.5
MAX	10.0	260	83.0	20.0	5.0	423	6.90	290	2.50	1.20	30.00	0.10	5.0	8.70	2.00	24.00	47.0	240.0	270	0.5
MEAN	10.0	253	71.5	15.0	4.5	403.5	5.85	280	2.00	0.65	25.50	0.10	5.0	8.24	1.50	15.00	31.0	180.0	245	0.5
Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1994																				
MIN	10.0	239	48.0	1.0	1.0	378	8.90	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	4.0	230	0.50
MAX	10.0	239	48.0	1.0	1.0	378	8.90	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	4.0	230	0.50
MEAN	10.0	239	48.0	1.0	1.0	378	8.9	202	0.20	0.20	20.00	0.10	5.0	8.73	4.00	8.00	19.0	4.0	230	0.50
1993																				
MIN	0.0	254	54.0	0.0	2.5	399	9.9	238	0.05	0.07	19.20	0.03	0.0	8.69	0.10	4.90	17.0	0.0	225	0.50
MAX	0.0	290	63.6	1.0	5.0	915	12.5	250	0.12	0.23	28.00	0.03	0.0	8.99	10.00	12.00	23.0	41.0	266	0.50
MEAN	0.0	272	58.8	0.5	3.7	657	11.2	244	0.08	0.15	23.60	0.03	0.0	8.84	5.05	8.45	20.0	20.0	245	0.50
1992																				
MIN	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.90	0.00	6.30	17.0	8.0	222	0.00
MAX	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.90	0.00	6.30	17.0	8.0	222	0.00
MEAN	0.1	262	63.9	0.1	15.0	371	9.4	255	0.07	0.11	23.10	0.14	0.7	8.90	0.00	6.30	17.0	8.0	222	0.00
1991																				
MIN	<1.0	244	58.2	<1.0	15.0	300	7.4	225	<0.02	<0.02	19.40	<0.02	1.5	8.20	0.12	3.78	7.0	2.0	231	<0.5
MAX	<1.0	329	108.6	<1.0	15.5	350	7.6	384	0.09	1.13	27.40	0.04	1.9	8.40	1.78	7.48	23.0	160.0	242	<0.5
MEAN	<1.0	287	83.4	<1.0	15.3	325	7.5	305	0.06	0.58	23.40	0.03	1.7	8.30	0.95	5.63	15.0	81.0	237	<0.5
HISTORICAL 1989-1994																				
MIN	0.1	227	48.0	0.1	1.0	300	6.9	201	0.02	0.02	18.60	0.01	0.7	8.15	0.01	3.78	7.0	2.0	222	0.01
MAX	10.0	329	108.6	4.0	15.0	439	12.5	384	1.13	0.20	28.00	0.14	5.0	8.88	10.00	12.00	80.0	160.0	277	0.50
MEAN	2.2	257	65.5	1.0	10.1	361	8.5	257	0.22	0.06	22.85	0.05	1.8	8.41	2.65	6.78	27.4	31.3	241	0.30
No. of Analysis	6	7	7	7	7	7	7	7	7	7	7	7	6	7	7	7	7	6	7	7

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 18: RILDA CANYON SURFACE WATER QUALITY *

RCF3 - RILDA CANYON FLUME - ABOVE NEWUA SPRINGS

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS (SOLIDS)	TDS (SOLIDS)	SETTLEABLE (SOLIDS)
3-95	10.0	370	83.0	15.0	8.0	710	5.30	400	0.20	0.10	47.00	0.10	5.0	7.88	3.00	15.00	70.0	5.0	400	0.50
6-95	10.0	270	90.0	20.0	4.0	443	4.60	330	3.00	0.40	25.00	0.10	5.0	8.24	1.00	7.00	10.0	250.0	260	0.50
9-95	10.0	285	59.0	5.0	5.0	458	6.20	279	1.10	0.10	32.00	0.10	5.0	8.19	2.00	9.00	31.0	50.0	270	0.50
12-95	10.0	415	76.0	5.0	8.0	643	7.40	379	0.20	0.10	46.00	0.10	5.0	8.40	2.00	13.00	76.0	10.0	470	0.50
1995																				
MIN	10.0	270	59.0	5.0	4.0	443	4.60	279	0.20	0.10	25.00	0.10	5.0	7.88	1.00	7.00	10.0	5.0	260	0.5
MAX	10.0	415	90.0	20.0	8.0	710	7.40	400	3.00	0.40	47.00	0.10	5.0	8.40	3.00	15.00	76.0	250.0	470	0.5
MEAN	10.0	335	77.0	11.3	6.3	563.5	5.88	347	1.13	0.18	37.50	0.10	5.0	8.18	2.00	11.00	46.8	78.8	350	0.5
Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	375	72.0	1.0	4.0	631	6.5	335	0.20	0.20	37.00	0.10	5.0	7.86	2.00	11.00	50.0	4.0	380	0.50
MAX	10.0	401	73.0	1.0	6.0	719	7.9	370	0.20	0.40	47.00	0.20	5.0	8.37	5.00	13.00	60.0	6.0	436	0.50
MEAN	10.0	388	72.5	1.0	5.0	675	7.2	352	0.20	0.30	42.00	0.15	5.0	8.12	3.50	12.00	55.0	5.0	408	0.50
1993																				
MIN	0.0	242	67.7	0.0	4.0	437	6.7	265	0.05	0.20	23.30	0.03	1.0	8.34	0.20	11.20	40.0	6.0	254	0.50
MAX	0.0	412	75.0	1.0	5.0	674	7.7	381	0.08	0.31	47.00	0.10	1.2	8.83	2.00	16.00	70.0	39.0	469	0.50
MEAN	0.0	327	71.3	0.5	4.5	555	7.2	323	0.06	0.25	35.15	0.06	1.1	8.59	1.10	13.60	55.0	22.5	361	0.50
1992																				
MIN	0.1	278	58.1	0.1	10.0	476	6.7	268	0.01	0.06	29.90	0.01	0.4	8.16	0.01	8.48	27.0	3.0	273	0.01
MAX	4.0	453	97.6	0.1	20.0	722	9.0	444	0.28	0.34	48.60	0.15	1.1	8.47	1.60	17.55	110.0	18.0	430	--
MEAN	1.4	375	80.1	0.1	13.3	634	7.9	370	0.10	0.19	41.37	0.06	0.7	8.33	0.92	13.86	72.3	8.7	377	0.01
1991																				
MIN	<1.0	340	72.2	0.0	15.0	380	7.1	365	0.01	<0.02	25.00	0.00	0.7	7.50	0.23	5.40	7.0	<1.0	241	0.00
MAX	14.0	422	105.1	<1.0	50.0	620	10.0	453	0.14	2.84	49.80	0.10	3.6	8.30	4.57	14.50	140.0	185.0	487	<0.50
MEAN	5.3	382	91.7	0.8	31.3	525	8.1	401	0.06	0.78	41.80	0.04	2.5	7.90	1.65	11.40	74.3	48.5	389	0.40
HISTORICAL 1989-1994																				
MIN	0.1	242	58.1	0.1	4.0	380	4.5	265	0.02	0.01	23.30	0.01	0.4	7.50	0.01	5.40	7.0	1.0	513	0.01
MAX	14.0	500	112.2	1.0	50.0	855	10.0	499	2.84	0.41	53.20	0.20	5.0	8.83	5.00	17.55	150.0	185.0	513	2.50
MEAN	3.5	388	86.9	0.6	14.6	626	7.4	394	0.35	0.11	42.97	0.05	1.9	8.07	1.84	12.84	79.1	20.7	403	0.45
No. of Analysis	15	18	18	17	18	19	19	18	18	17	18	17	18	19	18	18	18	18	18	17

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 19: RILDA CANYON SURFACE WATER QUALITY *

RCW4 - RILDA CANYON FLUME - NEAR HIGHWAY 31

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	365	79.0	20.0	13.0	802	3.90	390	0.20	0.10	46.00	0.10	5.0	8.06	3.00	26.00	110.0	10.0	460	0.50
6-95	10.0	310	100.0	15.0	5.0	476	5.00	370	3.80	0.10	29.00	0.10	5.0	8.15	1.00	8.00	20.0	290.0	260	0.50
9-95	10.0	325	65.0	10.0	11.0	618	6.00	352	0.30	0.10	46.00	0.10	5.0	8.53	2.00	16.00	74.0	15.0	460	0.50
12-95	10.0	420	74.0	5.0	13.0	724	7.20	424	0.10	0.10	58.00	0.10	5.0	8.69	3.00	24.00	94.0	5.0	500	0.50
1995																				
MIN	10.0	310	65.0	5.0	5.0	476	3.90	352	0.10	0.10	29.00	0.10	5.0	8.06	1.00	8.00	20.0	5.0	260	0.5
MAX	10.0	420	100.0	20.0	13.0	802	7.20	424	3.80	0.10	58.00	0.10	5.0	8.69	3.00	26.00	110.0	290.0	500	0.5
MEAN	10.0	355	79.5	12.5	10.5	655	5.53	384	1.10	0.10	44.75	0.10	5.0	8.36	2.25	18.50	74.5	80.0	420	0.5
Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	416	75.0	1.0	10.0	831	6.80	422	0.20	0.20	57.00	0.10	5.0	8.51	2.00	9.00	130.0	4.0	500	0.50
MAX	10.0	432	76.0	1.0	10.0	840	7.50	440	0.20	0.20	61.00	0.20	5.0	8.57	5.00	22.00	140.0	9.0	510	0.50
MEAN	10.0	424	75.5	1.0	10.0	835	7.1	431	0.20	0.20	59.00	0.10	5.0	8.54	3.50	20.50	135.0	6.5	505	0.50
1993																				
MIN	0.0	317	69.0	0.0	4.8	486	5.5	290	0.05	0.20	28.50	0.03	0.7	8.62	0.20	7.90	37.0	6.0	262	0.50
MAX	0.0	403	79.0	1.0	14.0	707	7.5	453	0.06	0.71	62.00	0.10	1.0	8.73	10.00	20.00	110.0	96.0	642	0.50
MEAN	0.0	360	74.0	0.5	9.4	596	6.5	371	0.05	0.45	45.25	0.06	0.8	8.67	5.10	13.90	73.5	56.0	452	0.50
1992																				
MIN	0.1	374	77.0	0.1	10.0	585	5.9	338	0.01	0.01	35.30	0.01	0.1	8.60	0.01	11.50	40.0	1.0	351	0.01
MAX	10.0	429	83.0	0.1	20.0	719	10.1	448	0.28	0.40	58.50	0.04	1.9	8.90	7.69	23.10	150.0	49.0	437	--
MEAN	3.4	400	79.9	0.1	13.3	665	8.2	383	0.10	0.14	44.60	0.03	0.9	8.80	2.57	15.90	90.0	17.7	380	0.01
1991																				
MIN	<1.0	298	72.7	0.0	13.5	400	6.9	389	0.00	0.00	36.70	0.00	<1.0	7.70	0.95	7.60	40.0	1.0	286	0.00
MAX	10.0	417	117.0	<1.0	45.0	700	10.9	457	0.18	2.06	58.70	0.15	2.4	8.30	4.71	19.00	100.0	505.0	490	<0.5
MEAN	4.0	373	89.5	0.8	24.6	603	8.5	433	0.06	0.61	51.00	0.05	1.7	8.00	2.64	15.40	80.0	131.0	424	0.40
HISTORICAL 1989-1994																				
MIN	0.1	298	63.0	0.1	4.8	400	5.2	290	0.01	0.01	28.50	0.01	0.1	7.70	0.01	7.60	37.0	1.0	262	0.01
MAX	10.0	461	132.7	5.0	700.0	840	10.9	545	2.06	0.28	67.20	0.20	5.0	8.86	10.00	52.00	250.0	505.0	642	1.00
MEAN	3.3	387	85.0	0.8	55.8	669	7.5	422	0.27	0.08	51.09	0.05	1.8	8.32	2.80	19.40	116.2	53.3	440	0.38
No. of Analysis	15	17	17	16	17	18	18	17	16	15	17	16	17	18	17	17	17	17	17	16

* Quality parameters are reported as mg/l unless otherwise noted.

1. Cottonwood Canyon Creek

Based on data collected by PacifiCorp, Cottonwood Canyon Creek is an ephemeral stream from its headwaters to Section 24, Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek. The majority of water moving through Cottonwood Canyon Creek appears to be through the colluvial valley deposits. An extensive hydrogeologic investigation was conducted in Cottonwood Canyon Dreek during 1992. Results can be found in Appendix F of the PAP submitted March 31, 1993. Four (4) permanent runoff sampling sites have been established along Cottonwood Canyon Creek and sampled as listed below. (See Hydrologic Monitoring Plan in Appendix Q).

a. Flow and Sampling Schedule

(1) Locations: (See Map No. 1 in pocket.)
(a) Above Mine - SW-1
(b) Below Mine - SW-2
(c) @ USGS Flume - CCC01*
(d) Above Straight Canyon - SW-3

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in December 1992 and will continue through 1996, i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed monthly in conjunction with quality measurements. Quantity will be monitored monthly.

* Flow and field parameters only.

b. Flow Information

As stated above, flow information is collected monthly throughout the year. (See Map 1 for flume locations.) A hydrograph for 1995 has been generated for each sampling location. (See Appendix E.) The hydrographs show the intermittent nature of Cottonwood Canyon Creek. Flow at SW-1, when accessible, occurred from March through December with a peak and base flow estimated at 22,50 and 5 GPM, respectively. Flow at SW-2 occurred from March through July with a peak and base flow estimated at 2,500 and 15 GPM, respectively. Flow at SW-3 occurred throughout the year with a peak and base flow estimated at 2,500 and 25 GPM, respectively.

c. Quality Information

Baseline quality analysis was conducted by Beaver Creek Coal in 1990. Baseline analysis will be incorporated in Energy West's Hydrologic Monitoring Plan and repeated again in 1996. The results of the 1995 operational quality analysis are listed in Tables 20, 21, and 22. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix E.

The Cottonwood Canyon Creek drainage quality is influenced by the following factors: 1) A relatively high amount of suspended solids during spring runoff from Indian, Roans, Mill, and Marines canyons; 2) Alluvial/colluvial deposit recharge and discharge areas.

TABLE 20: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-1

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	395	81.0	20.0	27.0	961	3.80	520	0.10	0.10	78.00	0.10	5.0	8.34	3.00	38.00	170.0	5.0	690	0.50
6-95	10.0	290	6.0	20.0	8.0	502	6.20	300	1.50	0.10	28.00	0.10	5.0	8.13	1.00	11.00	25.0	105.0	280	0.50
9-95	10.0	370	74.0	15.0	16.0	700	6.60	395	1.00	0.10	51.00	0.10	5.0	8.16	2.00	23.00	91.0	35.0	430	0.50
1995																				
MIN	10.0	290	6.0	15.0	8.0	502	3.80	300	0.10	0.10	28.00	0.10	5.0	8.13	1.00	11.00	25.0	5.0	280	0.50
MAX	10.0	395	81.0	20.0	27.0	961	6.60	520	1.50	0.10	78.00	0.10	5.0	8.34	3.00	38.00	170.0	105.0	690	0.50
MEAN	10.0	352	53.7	18.3	17.0	721	5.53	405	0.87	0.10	52.33	0.10	5.0	8.21	2.00	24.00	95.3	48.3	466.7	0.50
No. of Analysis	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
HISTORICAL 1977-1994																				
MIN	1.0	231	15.1	1.0	0.7	380.0	5.0	210.0	0.0	0.1	2.4	0.0	0.5	7.1	1.0	-1.0	20.0	0.5	226.0	0.1
MAX	22.0	433	152.3	8.0	25.2	930.0	9.9	466.0	15.9	0.4	61.6	1.3	358.0	8.7	21.0	60.0	238.7	1298.0	610.0	1.5
MEAN	4.3	336	67.0	1.6	12.5	668.2	7.9	330.0	1.0	0.1	38.0	0.1	11.7	7.8	3.4	21.1	74.2	78.9	370.5	0.3
No. of Analysis	38	59	58	13	59	20	6	26	57	14	59	52	37	54	57	59	59	57	59	12

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 21: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-2

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	325	74.0	35.0	40.0	955	3.00	490	0.10	0.10	73.00	0.10	5.0	8.67	4.00	46.00	190.0	10.0	700	0.50
6-95	10.0	290	71.0	20.0	8.0	515	6.20	300	1.10	0.10	30.00	0.10	10.0	8.24	1.00	12.00	32.0	85.0	350	0.50
9-95	10.0	320	63.0	30.0	27.0	715	6.60	404	0.90	0.10	60.00	0.10	5.0	8.71	3.00	33.00	104.0	45.0	540	0.50
12-95	10.0	440	74.0	10.0	27.0	811	8.80	465	0.10	0.10	68.00	0.10	5.0	8.93	3.00	33.00	136.0	5.0	610	0.50
1995																				
MIN	10.0	290	63.0	10.0	8.0	515	3.00	300	0.10	0.10	30.00	0.10	5.0	8.24	1.00	12.00	32.0	5.0	350	0.50
MAX	10.0	440	74.0	35.0	40.0	955	8.80	490	1.10	0.10	73.00	0.10	10.0	8.93	4.00	46.00	190.0	85.0	700	0.50
MEAN	10	344	71	24	26	749	6	415	1	0	58	0	6	9	3	31	116	36	550	1
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1977-1994																				
MIN	0.1	261	11.1	1.0	1.5	410	5.30	250	0.05	0.05	2.40	0.01	0.1	7.00	0.00	8.00	19.5	1.0	267	0.10
MAX	22.0	458	136.9	20.0	33.8	949	10.90	488	16.20	1.25	69.25	1.37	9.0	8.91	25.60	53.10	246.9	1004.0	700	1.50
MEAN	4	330	67	3	14	743	8	346	1	0	40	0	2	8	5	25	91	80	389	0
No. of Analysis	37	56	56	13	56	17	5	23	55	13	56	52	44	51	56	55	56	55	56	12

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 22: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-3

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS (SOLIDS)	TDS (SOLIDS)	SETTLEABLE (SOLIDS)
6-95	10.0	290	71.0	15.0	7.0	506	6.50	310	1.30	0.10	32.00	0.10	5.0	8.21	1.00	12.00	30.0	95.0	380	0.50
9-95	10.0	385	98.0	30.0	56.0	1178	7.90	644	0.10	0.10	97.00	0.10	5.0	8.35	4.00	90.00	339.0	5.0	960	0.50
12-95	10.0	420	102.0	5.0	54.0	1184	7.70	654	0.10	0.10	97.00	0.10	5.0	8.64	3.00	90.00	355.0	5.0	950	0.50
1995																				
MIN	10.0	290	71.0	5.0	7.0	506	6.50	310	0.10	0.10	32.00	0.10	5.0	8.21	1.00	12.00	30.0	5.0	380	0.50
MAX	10.0	420	102.0	30.0	56.0	1184	7.90	654	1.30	0.10	97.00	0.10	5.0	8.64	4.00	90.00	355.0	95.0	960	0.50
MEAN	10	365	90	17	39	956	7	536	1	0	75	0	5	8	3	64	241	35	763	1
No. of Analysis	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
HISTORICAL 1977-1994																				
MIN	0.1	253	14.3	0.1	1.7	510	5.20	245	0.04	0.05	2.40	0.01	0.2	7.20	1.62	3.00	22.0	1.0	40	0.10
MAX	18.0	451	159.0	14.0	59.2	1381	9.90	614	19.00	0.43	96.37	2.48	114.0	8.69	30.00	88.80	386.0	5024.0	976	1.50
MEAN	4.0	339	75.7	2.0	23.9	1114	7.71	450	1.33	0.14	46.58	0.14	4.5	7.95	4.57	38.44	146.3	167.0	494	0.36
No. of Analysis	39	60	59	16	59	21	8	27	57	15	60	49	53	55	58	59	60	57	60	13

*** Quality parameters are reported as mg/l unless otherwise noted.**

2. Grimes Wash

Grimes is an ephemeral tributary of Cottonwood Creek and flows in the same canyon in which the Wilberg/Cottonwood Mine is located. Three permanent runoff sampling sites were established in 1980 and are sampled as listed below (see Hydrologic Monitoring Plan in Appendix Q).

a. Flow and Sampling Schedule

(1) Locations: (See Map No. 1 in pocket.)
(a) Right Fork - GWR01
(b) Left Fork - GWR02
(c) Below the Mine - GWR03

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:
Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Appendix Q.) The program was initiated in March 1988 and will continue through 1996 i.e., June, September, and December. Field measurements including pH, specific conductivity, and temperature will be performed in conjunction with quality measurements. Quantity will be monitored monthly.

b. Flow Information

As stated above, flow information is collected monthly throughout the year with the use of two Parshall flumes. (See Map 1 for flume locations.) A hydrograph comparing 1995 to the data collected from 1990 through 1994 has been generated for each flume location. (See Appendix F.) The hydrographs show that the Right and Left forks remained dry throughout 1995. Flow at the Below the Mine location continued throughout the year due to the influence of the springs emanating from the Starpoint Sandstone/Mancos Shale formational contact and Wilberg/Cottonwood Mine discharge. Peak flow occurred

during the month of October at 650 GPM, and baseline flow averaged approximately 50 GPM.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 1991. Baseline analysis will be repeated once every five (5) years. The results of the 1995 operational quality analysis are listed in Tables 23, 24, and 25. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix F.

The Grimes Wash drainage quality is influenced by two factors: 1) Under normal conditions the Right Fork contributes a relatively high amount of suspended solids during spring runoff due to the fact that it is a south facing canyon dominated by argillaceous sediments; 2) Mancos Shale/Starpoint Sandstone interface seeps and springs elevate the TDS at the Below the Mine location.

TABLE 23: GRIMES WASH WATER QUALITY *

GWR01 - RIGHT FORK

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS (SOLIDS)	TDS (SOLIDS)	SETTLEABLE (SOLIDS)
No flow during 1989 - 95																				
1988																				
MIN	39.0	112	43.8	<1.0	26.4	225	9.70	154	0.61	0.78	10.90	0.04	9.0	8.20	5.20	1.90	27.0	8.0	196	<1.0
MAX	39.0	112	43.8	<1.0	26.4	225	9.70	154	0.61	0.78	10.90	0.04	9.0	8.20	5.20	1.90	27.0	8.0	196	<1.0
MEAN	39.0	112	43.8	<1.0	26.4	225	9.70	154	0.61	0.78	10.90	0.04	9.0	8.20	5.20	1.90	27.0	8.0	196	<1.0
1987																				
MIN	<1.0	104	34.4	<1.0	3.0	190	6.80	112	3.31	20.60	6.30	0.05	---	7.20	7.60	2.00	20.0	2000.0	115	3.30
MAX	<1.0	104	34.4	<1.0	3.0	190	6.80	112	3.31	20.60	6.30	0.05	---	7.20	7.60	2.00	20.0	2000.0	115	3.30
MEAN	<1.0	104	34.4	<1.0	3.0	190	6.80	112	3.31	20.60	6.30	0.05	---	7.20	7.60	2.00	20.0	2000.0	115	3.30
1986																				
MIN	<1.0	240	30.0	<1.0	8.3	465	7.6	222	<0.05	<0.05	35.70	<0.01	<0.5	7.50	1.60	3.40	40.0	0.5	262	<1.0
MAX	<1.0	320	52.0	<1.0	11.5	680	9.8	320	<0.05	0.73	46.20	0.05	2.2	8.10	3.30	20.40	120.0	257.0	389	<0.5
MEAN	<1.0	275	41.6	<1.0	10.2	547.6	8.8	268	<0.05	0.24	39.90	0.02	0.7	7.80	2.50	15.70	61.3	60.6	316	0.2
HISTORICAL 1979-1994																				
MIN	0.1	104	30.0	1.0	3.0	190	6.8	112	0.01	0.05	6.30	0.01	0.5	7.20	1.60	1.85	20.0	0.5	115	0.10
MAX	39.0	320	52.0	1.0	26.4	750	9.8	320	20.60	3.31	46.20	0.30	9.0	8.70	7.64	20.44	161.7	7116.0	700	3.30
MEAN	5.5	237	41.0	1.0	11.3	560	8.6	238	1.35	0.47	32.95	0.06	1.8	8.07	3.35	14.09	64.3	376.3	338	0.60
No. of Analysis	11	9	9	9	11	42	9	9	46	9	9	42	12	46	9	9	13	46	46	9

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 24: GRIMES WASH WATER QUALITY *

GWR02 - RIGHT FORK

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
No flow during 1994																				
1993																				
MIN	3.0	276	88.9	0.0	8.9	470	11.70	327	0.22	2.52	25.40	0.10	0.6	8.70	1.90	13.20	80.0	294.0	366	0.6
MAX	3.0	276	88.9	0.0	8.9	470	11.70	327	0.22	2.52	25.40	0.10	0.6	8.70	1.90	13.20	80.0	294.0	366	0.6
MEAN	3.0	276	88.9	0.0	8.9	470	11.70	327	0.22	2.52	25.40	0.10	0.6	8.70	1.90	13.20	80.0	294.0	366	0.6
No flow during 1989 - 92																				
1988																				
MIN	34.0	312	71.5	<1.0	10.0	600	7.00	337	<0.02	<0.02	38.50	<0.01	2.0	8.40	1.10	24.20	105.0	4.0	428	<0.05
MAX	34.0	312	71.5	<1.0	10.0	600	7.00	337	<0.02	<0.02	38.50	<0.01	2.0	8.40	1.10	24.20	105.0	4.0	428	<0.05
MEAN	34.0	312	71.5	<1.0	10.0	600	7.00	337	<0.02	<0.02	38.50	<0.01	2.0	8.40	1.10	24.20	105.0	4.0	428	<0.05
1987																				
MIN	<1.0	188	2.3	<1.0	6.0	412	5.00	337	<0.05	<0.05	23.80	<0.01	<0.5	7.60	1.00	11.10	45.0	<1.0	212	0.00
MAX	<1.0	482	71.1	15.0	156.0	610	7.80	460	0.12	0.62	68.50	0.06	3.5	8.60	2.50	34.00	9.0	48.0	382	0.20
MEAN	<1.0	317	38.1	3.8	56.6	526	7.00	296	0.07	0.17	43.40	0.02	1.7	7.80	1.40	28.50	73.6	14.6	307	0.10
1986																				
MIN	<1.0	281	36.0	<1.0	7.7	410	7.40	252	<0.05	<0.05	37.70	<0.01	<0.5	7.40	1.30	25.20	67.0	3.0	293	<0.10
MAX	<1.0	331	58.0	<1.0	10.9	690	9.60	310	<0.05	0.22	43.80	0.07	0.6	8.00	3.00	34.00	115.0	253.0	427	<0.50
MEAN	<1.0	304	45.5	<1.0	8.8	591	8.60	278	<0.05	0.12	39.90	0.02	0.5	7.70	1.90	29.20	77.9	54.1	346	0.20
HISTORICAL 1979-1994																				
MIN	1.0	188	2.3	1.0	6.0	410	5.00	196	0.02	0.02	23.80	0.01	0.1	7.30	1.00	11.10	30.4	0.5	212	0.05
MAX	34.0	482	88.9	15.0	156.0	790	11.70	460	2.52	0.22	68.50	0.15	3.5	8.72	3.00	34.00	115.0	1428.0	570	0.60
MEAN	3.3	307	47.5	2.0	18.9	624	8.00	291	0.19	0.08	40.20	0.03	1.0	7.98	1.61	27.50	74.1	56.6	362	0.16
No. of Analysis	15	15	15	14	15	50	15	15	52	7	15	51	15	52	15	15	16	53	52	14

* Quality parameters are reported as mg/l unless otherwise noted.

TABLE 25: GRIMES WASH WATER QUALITY *

GWR03 - RIGHT FORK

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	325	90.0	10.0	60.0	1100	5.50	480	0.30	0.10	63.00	0.10	5.0	8.63	8.00	82.00	220.0	10.0	760	0.50
6-95	10.0	340	86.0	15.0	27.0	970	6.70	440	0.60	0.10	55.00	0.10	5.0	7.81	7.00	44.00	180.0	5.0	650	0.50
9-95	10.0	315	92.0	10.0	94.0	1089	8.30	502	0.10	0.10	66.00	0.10	5.0	8.46	7.00	81.00	232.0	10.0	850	0.50
12-95	10.0	375	107.0	5.0	91.0	1128	8.30	572	0.10	0.10	74.00	0.10	5.0	8.66	6.00	82.00	264.0	5.0	930	0.50
1995																				
MIN	10.0	315	86.0	5.0	27.0	970	5.50	440	0.10	0.10	55.00	0.10	5.0	7.81	6.00	44.00	180.0	5.0	650	0.5
MAX	10.0	375	107.0	15.0	94.0	1128	8.30	572	0.60	0.10	74.00	0.10	5.0	8.66	8.00	82.00	264.0	10.0	930	0.5
MEAN	10.0	339	93.8	10.0	68.0	1072	7.20	499	0.28	0.10	64.50	0.10	5.0	8.39	7.00	72.25	224.0	7.5	798	0.5
Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1994																				
MIN	10.0	325	86.0	1.0	19.0	941	5.70	430	0.10	0.20	53.00	0.10	5.0	8.06	8.00	37.00	180.0	4.0	579	0.50
MAX	10.0	398	108.0	5.0	140.0	1560	8.20	607	0.20	1.90	82.00	0.20	5.0	8.81	9.00	114.00	310.0	40.0	980	0.50
MEAN	10.0	358	96.2	2.7	61.5	1199	6.60	498	0.18	0.90	63.00	0.13	5.0	8.42	8.25	73.00	227.5	16.0	754	0.50
1993																				
MIN	0.0	249	95.8	0.0	17.4	590	5.20	364	0.05	0.23	30.40	0.06	0.0	7.76	2.10	27.10	120.0	2.0	444	0.50
MAX	10.0	362	163.0	1.0	103.7	3280	10.30	736	0.22	5.10	93.00	0.10	5.0	8.61	10.00	60.00	370.0	280.0	2109	0.70
MEAN	2.5	320	127.0	0.3	46.2	1640	8.30	578	0.16	1.90	63.35	0.09	1.6	8.28	6.40	42.60	247.0	78.5	1079	0.60
1992																				
MIN	0.1	214	96.0	0.1	25.0	1230	5.30	488	0.01	0.07	60.20	0.04	0.1	8.20	3.41	60.80	340.0	8.0	955	0.01
MAX	50.0	369	190.8	0.1	365.0	2190	9.00	766	0.30	0.34	74.00	0.11	1.1	8.70	10.70	283.70	450.0	58.0	1393	--
MEAN	12.4	313	154.2	0.1	252.6	1754	6.70	665	0.11	0.22	67.86	0.06	0.8	8.42	7.14	207.80	400.0	22.2	1201	0.01
1991																				
MIN	<1.0	295	71.4	0.0	25.0	710	6.90	385	<0.02	0.09	26.90	<0.02	0.6	7.60	<0.01	25.70	200.0	3.0	565	0.00
MAX	22.0	338	205.6	<1.0	735.0	3000	9.90	849	0.85	0.86	81.60	0.12	2.3	8.20	12.80	460.50	420.0	247.0	2080	<0.5
MEAN	7.0	313	151.7	0.8	236.0	1510	7.90	629	0.20	0.35	60.70	0.06	1.4	7.90	4.67	148.30	312.0	64.0	1131	0.40
HISTORICAL 1979-1994																				
MIN	0.1	117	5.1	0.1	10.0	220	4.50	146	0.01	0.01	10.70	0.01	0.1	7.10	0.01	9.00	46.0	0.5	152	0.01
MAX	127.0	486	274.0	5.0	4531.0	12000	11.40	1165	22.60	2.26	116.80	0.90	27.0	8.81	12.80	3181.00	600.0	'9702.0	7160	35.00
MEAN	11.5	340	132.9	1.0	286.0	1492	7.50	635	0.90	0.18	72.34	0.06	2.6	7.97	5.87	211.04	322.7	203.6	926	1.32
No. of Analysis	48	46	46	43	48	86	48	46	88	47	46	85	47	90	46	46	49	88	88	40

* Quality parameters are reported as mg/l unless otherwise noted.

IV. SPRINGS

A. East Mountain

Between the time PacifiCorp began monitoring springs on East Mountain and 1986 the number of springs measured increased from less than fifty (50) to nearly eighty (80). PacifiCorp believed that more benefit could be realized by concentrating its monitoring to selective springs in the areas that will be undermined within the next five years. (See Map 5 in pocket.) A meeting was held on March 25, 1987 with the U. S. Forest Service and the Utah State Division of Oil, Gas and Mining to determine the most effective plan for PacifiCorp's monitoring. A subsequent meeting was held on April 15, 1987 with the State Division of Oil, Gas and Mining to finalize the monitoring plan revisions. In addition to major revisions made in 1987, each year a meeting is held with State and Federal agencies to adjust the monitoring schedule based on field investigations.

During the meetings it was resolved that the following springs will be monitored. Eight additional springs (denoted with a plus [+] symbol below) were added in 1989 after the annual field verification process jointly conducted by DOGM and PacifiCorp.

*	Burnt Tree Springs		79-40
*	Elk Spring		80-41
*	Sheba Springs		80-43
	Ted's Tub	*	80-44
	79-2	*	80-46
*	79-10		80-47
	79-15	+	80-48
*	79-23		82-51
	79-24	*	82-52
*	79-26	*	84-56
+	79-28	+	89-60 (Alpine Spring)
*	79-29	+	89-61
	79-32	+	89-65
	79-34	+	89-66
*	79-35	+	89-67
	79-38	+	89-68

Of these springs, twelve will be monitored on a monthly basis, weather permitting, and have been denoted on the above list with asterisks (*).

1. Flow and Sampling Schedule

a. Flow

All springs on the preceding list are measured during the months of July and October. In addition, a minimum of twelve springs are monitored to establish a discharge recession curve. Generally, measurements are made on a monthly basis during the months of July through October if weather and reasonable access permit; but, when historical data indicate that a spring is short-lived, all efforts are made to measure discharge from that spring at least three times, equally spaced, within its flow period.

b. Quality Samples

All springs listed above are sampled for water quality characteristics during the months of July and October. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.)

2. Spring Flow

Both precipitation and spring discharge rates increased from 1994 to 1995, whereas temperature, a critical factor on spring discharge rates, was 2.2 degrees higher in 1995 than the historical average. Table 26, A and B, is a tabulation of the flow data collected during the 1995 monitoring season. To record the season variation, all springs measured in July are measured again in October. The seasonal variation is represented in Table 26, A and B, under the column heading "Seasonal Net Change." The percentage figures represent the amount of change, either positive or negative. The average change

reveals a sixty one percent (61%) [eighty-five percent (85%) by volume] decrease from the July to the October measurements.

A thirteen-year comparison of spring discharge is shown in Table 27. The table includes a year by year comparison of springs identified from each mode of occurrence (Table 28). The springs utilized in the comparison are underlined in Table 28. The flow values for the individual springs represent the July measurements. October measurements were not utilized because winter weather conditions caused some springs to be inaccessible.

Table 27 has been compared to East Mountain climatology to see how closely spring discharge rates follow local annual precipitation. Figure 3 reveals good correlation between spring discharge and precipitation. Along with precipitation, temperature plays a critical role in yearly discharge variations, especially during the early stages of the runoff period. Listed in Table 29 is a comparison of January through June temperature data from surrounding weather stations for the period 1982-95 versus departure from normal. The comparison is vital in determining mining effects on spring discharge versus general changes in annual precipitation.

Table 29 clearly demonstrates near average temperatures between 1982 and 1984, but starting in 1985 and continuing through 1995 (except for 1991) positive departure from normal has been significant. In 1995 the temperatures were 2.2 degrees above average. Comparison between spring discharge rate and general changes in annual precipitation patterns correlated well in the past due to relatively normal temperatures experienced during the early runoff period (January through June). Figure 3 not only includes a comparison of spring discharge rate and precipitation as in the past but also temperature departure due to critical influence temperature has on peak discharge occurrence.

TABLE 26A: EAST MOUNTAIN SPRINGS DISCHARGE
1995

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
Sheba	7-14-95	10.6	8.6	10-27-95	1.3	7.6	-87.7
Elk Spring	7-14-95	599.3	6.0	10-27-95	73.0	5.2	-87.8
Burnt Tree	7-18-95	7.5	8.0	10-27-95	12.0	7.3	60.0
Jerk Water							
Pine Springs							
Pine Sp. Trough							
Ted's Tub	7-18-95	76.2	7.0	10-27-95	1.1	4.6	-98.6
79-1							
79-2	7-19-95	2.6	8.0	10-27-95	2.0	6.7	-23.1
79-3							
79-4							
79-5							
79-6							
79-7							
79-8							
79-9							
79-10	7-14-95	30.0	7.0	10-27-95	5.0	7.0	-83.3
79-11							
79-12	7-18-95	12.0	17.0	10-27-95	damp		
79-13							
79-14							
79-15	7-18-95	33.3	7.0	10-27-95	5.5	9.1	-83.5
79-16							
79-17							
79-18							
79-19							
79-20							
79-21							
79-22							
79-23	7-19-95	Standing water		10-27-95	dry		
79-24	7-19-95	0.1 est.		10-27-95	damp		
79-25							
79-26	7-19-95	10.0	17.0	10-27-95	1.5	11.0	-85.0
79-27							
79-28	7-19-95	1.5	8.0	10-27-95	1.0	7.0	-33.3
79-29	7-19-95	3.1	4.0	10-27-95	1.7	5.6	-45.2
79-30							
79-31							
79-32	7-19-95	1.0	12.0	10-27-95	frozen - no flow		
79-33							
79-34	7-18-95	30.0	5.0	10-27-95	damp		
79-35	7-14-95	3.0	7.3	10-27-95	damp - frozen		
79-36							
79-37							
79-38	7-18-95	10.0	8.0	10-27-95	1.7	7.0	-83.0
79-39							
79-40	7-19-95	2.0	4.0	10-27-95	est. @ <0.1		
80-41	7-19-95	2.4	4.0	10-27-95	dry		

TABLE 26B: EAST MOUNTAIN SPRINGS DISCHARGE
1995

Spring	Date Sampled	Flow (GPM)	Temp. ° F	Date Sampled	Flow (GPM)	Temp. ° F	Seasonal Net Change %
80-42							
80-43	7-19-95	1.5	5.0	10-27-95	dry		
80-44	7-19-95	3.0	12.0	10-27-95	damp		
80-45							
80-46	7-19-95	5.0	5.0	10-27-95	dry		
80-47	7-19-95	12.6	9.0	10-27-95	6.0	5.8	-52.4
80-48	7-18-95	12.0	7.0	10-27-95	2.9	6.6	-75.8
80-49							
80-50							
82-51	7-19-95	3.0	10.0	10-27-95	frozen		
82-52	7-19-95	15.0	6.5	10-27-95	4.0	6.7	-73.3
84-53	7-19-95	10.0	7.0	10-27-95	4.0	6.3	-60.0
84-54							
84-55							
84-56	7-19-95	1.0	5.0	10-27-95	0.6	6.2	-40.0
85-57							
86-58							
86-59							
89-60	7-18-95	4.0	8.0	10-27-95	est. @ <0.5		
89-61	7-18-95	200.0	7.0	10-27-95	44.8	6.0	-77.6
89-62							
89-63							
89-64							
89-65	7-18-95	2.1	5.0	10-27-95	est. @ <0.1		
89-66	7-18-95	8.6	5.0	10-27-95	est. @ <0.5		
89-67	7-18-95	16.7	4.0	10-27-95	3.3	5.5	-80.2
89-68	7-18-95	5.0	8.0	10-27-95	est. @ <0.5		
89-69							
89-70							
89-71							
91-72	7-25-95	6.0	8.0	10-26-95	9.2	13.4	53.3
91-73	7-25-95	2.1	7.0	10-26-95	1.0	11.1	-52.4
TOTAL FLOW FOR JULY (Without 91-72 & 73)		1134.1			171.4		
				Net Change - Average			-61.7
				Net Change - By Volume			-84.9

TOTAL FOR JULY 1994 = 97.8 GPM
JULY 1995 1060% LOWER THAN JULY 1994

TABLE 27: EAST MOUNTAIN YEARLY SPRING DISCHARGE VARIATIONS (GPM)

JULY FLOW DATA

Spring	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Burnt Tree	30.5	26.6	26.1	17.5	10.2	12.0	6.4	4.1	2.0	4.0	8.6	7.5	7.5
Elk Spring	642.3	427.9	390.5	309.7	217.0	217.4	78.5	130.8	176.0	116.8	369.9	46.2	599.3
Sheba	22.9	19.7	14.4	8.6	11.4	10.4	1.1	8.1	10.1	6.3	11.0	0.9	10.6
Ted's Tub	89.0	48.0	39.1	31.6	69.0	60.0	5.0	13.0	21.0	13.6	51.0	6.0	76.2
79-2	9.1	9.7	5.5	2.9	4.0	2.1	2.7	3.9	2.4	2.3	7.5	1.7	2.6
79-10	37.1	20.0	33.3	26.1	26.1	25.0	7.0	10.2	12.5	10.5	30.0	4.0	30.0
79-15	42.9	26.1	18.2	18.2	14.6	12.7	2.9	3.0	5.0	4.1	20.7	2.0	33.3
79-23	20.0	3.6	6.8	0.6	damp	damp	dry	dry	damp	dry	damp	day	standing water
79-24	9.3*	6.1*	5.0	4.3	damp	0.8	dry	dry	dry	dry	damp	dry	0.1
79-26	20.7	20.0	10.9	8.7	1.5	3.3	0.3	dry	damp	damp	10.0	dry	10.0
79-29	10.0	6.2	6.0	4.7	2.5	2.6	1.1	1.3	1.7	0.8	2.9	0.7	3.1
79-32	3.3	3.1	2.7	1.3*	1.0	0.6	0.5	damp	standing water no flow	standing water no flow	1.3	damp	1.0
79-34	356.7	42.9	18.5	16.7	10.5	13.3	dry	dry	0.3	damp	13.0	dry	30.0
79-35	15.0	10.5	10.5	7.8	6.3	2.7	dry	1.9	4.3	4.4	8.9	0.5	3.0
79-38	10.9	9.2	4.7	3.6	8.3	10.0	1.1	7.8	6.5	2.3	6.4	0.5	10.0
79-40	15.0	8.3	5.6	4.7	2.0	5.4	dry	dry	dry	dry	4.0	dry	2.0
80-41	10.9	15.0	5.8	4.1	2.5	3.9	dry	dry	dry	dry	4.0	dry	2.4
80-43	24.0	20.0	6.6	3.1	0.4	1.8	dry	dry	dry	dry	2.7	dry	1.5
80-44	24.0	13.1	5.5	2.2	dry	0.5	dry	dry	dry	dry	1.4	dry	3.0
80-46	60.0	28.3	18.2	12.0	4.0	6.7	dry	dry	dry	dry	7.5	dry	5.0
80-47	20.0	15.0	12.5	12.2	7.4	9.9	4.6	2.0	1.3	3.3	13.3	2.2	12.6
82-51	10.0	5.9	3.8	2.6	damp	damp	dry	dry	<0.1	damp	3.2	damp	3.0
82-52	80.0	48.0	32.1	23.3	20.1	21.5	2.6	1.3	1.0	1.0	16.7	2.0	15.0
84-56	9.6*	6.3	4.7	3.7	2.5	2.9	1.6	1.0	0.5	0.6	1.0	0.3	1.0
TOTALS	1,293.2	839.5	687.0	530.2	421.3	425.5	115.4	188.4	244.7	170.0	595.0	74.5	862.2

* No measurement - utilized yearly comparison.

TABLE 28: MODES OF OCCURRENCE - EAST MOUNTAIN SPRINGS

Occurrences

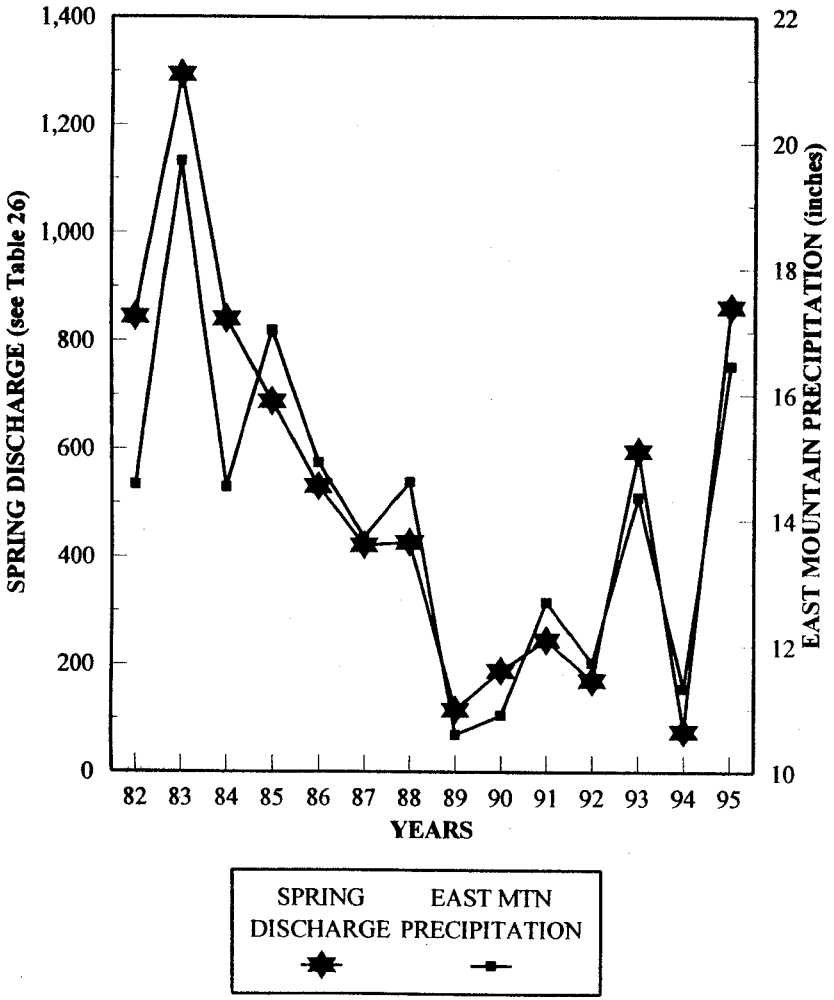
Stratigraphic Location	Permeable fluvial channels that intersect the land surface	Flow along permeable strata underlain by impermeable mudstone which intersects the land surface	Contact of permeable beds and the Roans Canyon Fault zone	Mode of occurrence not identified
Base of Flagstaff Limestone		79-6, 79-7, 79-35, 86-58	Sheba Springs, 79-1	
North Horn Formation	Ieds Tub, Burnt Tree, 79-2, 79-3, 79-8, 79-9, 79-11, 79-12, 79-13, 79-14, 79-15, 79-16, 79-17, 79-21, 79-22, 79-26, 79-27, 79-28, 79-29, 79-34, 79-39, 80-42, 80-43, 80-46, 80-47, 80-48, 84-53, 84-56, 86-59, 89-62, 89-63, 89-64, 89-65, 89-66, 89-67, 89-68		Elk Springs, 79-10, 79-18, 79-19, 79-20, 84-54, 89-61	
Base of North Horn Formation		79-23, 79-25, 79-32, 79-36, 79-37, 79-38, 84-55	79-30, 79-31	
Other Stratigraphic Locations	Blackhawk Formation 80-50, 84-57, 91-73 Bear Canyon Fault Zone 82-51 (Price River)	Price River Formation 79-24, 79-33, 79-40, 80-41, 80-44, 80-45, 82-52, Jerk Water, 89-60 (Alpine)	80-49 (Price River) 91-72 (Blackhawk)	Flagstaff Limestone 79-4, 79-5, Pine Springs Trough

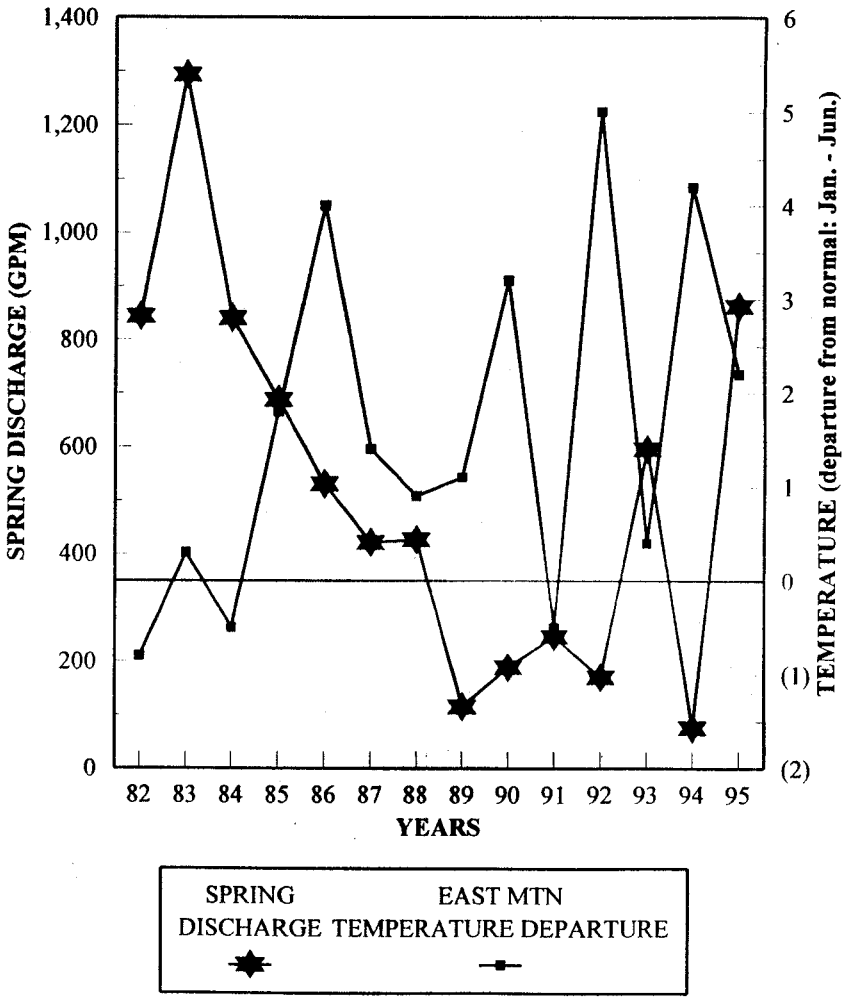
TABLE 29: TEMPERATURE COMPARISON

MONTH	EAST MOUNTAIN DEPARTURE FROM NORMAL	ELECTRIC LAKE DEPARTURE FROM NORMAL	HUNTER PLANT DEPARTURE FROM NORMAL	HUNTINGTON PLANT DEPARTURE FROM NORMAL
1987				
JAN	-4.2	-4.8	-2.6	+0.8
FEB	-1.4	-6.3	+3.0	+1.7
MAR	-2.2	-2.7	+0.5	-3.1
APR	+7.3	+5.5	+6.2	+5.1
MAY	+5.4	+3.6	+4.4	+0.3
JUN	+5.3	+2.0	+7.7	+1.8
1988				
JAN	-3.7	-4.2	-7.1	-3.1
FEB	+0.7	-3.0	+3.0	+0.7
MAR	-1.8	-3.4	+2.6	-1.5
APR	+2.6	+4.1	+4.5	+2.2
MAY	+4.2	+1.2	+4.9	+0.9
JUN	+3.2	+4.5	+9.6	+2.4
1989				
JAN	-2.1	-4.3	-7.8	-4.8
FEB	-3.5	-6.6	-1.4	-5.7
MAR	+5.7	+8.1	+9.5	+3.8
APR	+6.0	+6.9	+9.5	+5.7
MAY	+4.4	+4.0	+6.8	+0.7
JUN	-4.5	-6.4	+5.0	-1.8
1990				
JAN	-2.4	-0.8	+3.7	+0.9
FEB	-1.1	-4.9	+5.2	-2.0
MAR	+1.9	+7.0	+8.7	+2.6
APR	+2.1	+6.3	+10.9	+4.6
MAY	+0.8	+3.0	+6.8	-1.3
JUN	+3.3	+4.8	+10.9	+1.0
1991				
JAN	-1.9	-2.2	-4.5	-4.4
FEB	+5.8	+0.6	+7.5	+3.7
MAR	-13.3	-2.5	+2.8	-5.8
APR	-5.5	-3.0	+1.9	-3.3
MAY	-0.7	-1.8	+5.1	-5.1
JUN	-1.2	-0.6	+7.7	-2.8
1992				
JAN	-0.4	+0.8	-6.2	-1.6
FEB	+0.8	+7.8	+5.5	+0.9
MAR	+2.2	+8.0	+8.5	+2.9
APR	+4.9	+11.8	+12.6	+8.6
MAY	+4.5	+7.0	+11.8	+3.3
JUN	-0.5	+3.6	+7.6	-3.3
1993				
JAN	-3.8	+2.7	+0.9	-0.8
FEB	-3.5	-2.9	+0.5	-4.3
MAR	+4.2	-3.6	+7.2	-0.5
APR	-2.2	+0.1	+4.4	-2.0
MAY	+4.1	+2.8	+8.9	+1.6
JUN	-3.9	-2.2	+5.8	-4.1
1994				
JAN	+0.8	+2.3	-1.2	+6.3
FEB	-3.5	+3.2	+1.6	-3.5
MAR	+6.1	+6.6	+10.1	+5.0
APR	0.0	+6.0	+4.7	+0.2
MAY	+4.6	+7.2	+8.9	+2.7
JUN	+9.1	+4.8	+13.4	+5.4
1995				
JAN	+1.4	+1.6	+3.9	+1.5
FEB	+10.3	+5.2	+11.8	+7.4
MAR	+3.1	+2.4	+7.6	+0.1
APR	+3.4	-0.1	+3.4	-2.0
MAY	+2.2	-3.9	+3.4	-5.5
JUN	+1.1	-2.2	+2.5	-6.6

YEAR	EAST MOUNTAIN	ELECTRIC LAKE	HUNTER PLANT	HUNTINGTON PLANT	TOTAL
1982		-2.8	-0.03	+1.2	-0.8
1983		-2.7	2.5	+1.0	+0.3
1984		-2.2	0.5	0.13	-0.5
1985	3.1	0.3	3.0	0.9	+1.8
1986	2.9	3.4	6.3	3.2	+4.0
1987	1.7	-0.5	3.2	1.1	+1.4
1988	-0.2	-0.1	3.5	0.5	+0.9
1989	0.0	-0.1	4.1	0.3	+1.1
1990	2.3	1.8	7.3	1.2	+3.2
1991	-1.9	-1.4	3.8	-2.5	-0.5
1992	+1.9	+6.5	+6.6	+1.8	+5.0
1993	-0.9	-0.5	+4.6	-1.7	+0.4
1994	+2.9	+5.0	+6.3	+2.7	+4.2
1995	+3.6	+0.5	+5.4	-0.9	+2.2

FIGURE 3
EAST MOUNTAIN
SPRING DISCHARGE vs. PRECIPITATION & TEMPERATURE





An additional flow information study was initiated during the summer of 1985. The purpose of the program is to establish flow recession curves for the following springs: (1) Burnt Tree, (2) Elk Springs, (3) Sheba, (4) 79-10, (5) 79-23, (6) 79-26, (7) 79-29, (8) 79-35, (9) 80-44, (10) 80-46, (11) 82-52, (12) 84-56. The flow information collected during 1995 is shown in Table 30; corresponding spring recession curves comparing 1995 to 1989-1994 are located in Appendix G.

TABLE 30: EAST MOUNTAIN REGRESSION STUDY(FLOW*/TEMP.**)

1995

Spring	July	August	September	October
Burnt Tree	7.5/8	8.6/8	9.1/8	12.0/7
Elk Spring	599.3/6	176.09/7	110.0/6	73.0/5
Sheba	10.6/9	4.3/7	2.0/8	1.3/8
79-10	30.0/7	15.0/4	9.0/8	5.0/7
79-23	Damp	Dry	Dry	Dry
79-26	17.0/17	2.3/18	1.9/12	1.5/11
79-29	3.1/4	2.3/7	2.4/7	1.7/6
79-35	3.0/7	5.5/8	2.1/8	Damp
80-44	3.0/12	Damp	Damp	Damp
80-46	5.0/5	0.5/8	Damp	Dry
82-52	15.0/7	10.0/6	7.5/7	4.0/7
84-56	1.0/5	0.7/10	0.2/7	0.6/6

* All flow given in gallons per minute
** Temperatures reported in degrees centigrade

3. Quality

To more closely identify springs which are related one with another, water samples were analyzed to determine the percentage of cations and anions in solution. The percentages have been graphically represented as cation-anion diagrams. (See Appendix G.) The purpose of the cation-anion diagrams is to identify groups of related springs by water chemistry. To better visualize the concept, the cation-anion diagrams are presented by the geologic formation in which the spring originates. A general pattern for the Flagstaff and Price River formations can be recognized for each year in which the cations/anions were analyzed. A consistent pattern for the North Horn is less obvious due to the complex geology of the formation itself. One aspect the cation-anion diagrams demonstrate is that, even though the quality varies slightly from individual sites as well as from different formations, seasonal variations do not exist.

The quality of the springs sampled in 1995 reveals an excellent correlation with historical averages. A summary of the water quality analysis for a representative group

of East Mountain Springs is presented in Table 31. In the table the mean values for 1995 are compared to the historical results for each respective spring. The raw data regarding all springs sampled is contained in Appendix G.

Table 31: East Mountain Springs Water Quality (Historical vs. 1995) *

PARAMETER	Burnt Tree		Elk Spring		Sheba Spring		79-10		79-23		79-26	
	Historical	1995	Historical	1995	Historical	1995	Historical	1995	Historical	1995	Historical	1995
Elevation	9260		9350		9740		9350		9035		9310	
Geologic Formation	TKn		TKn		Tf		Kpr		TKn		TKn	
Bicarbonate	331	330	291	285	290	291	318	317	413	no flow during 1995	334	303
Calcium	63.1	54.5	65.2	58.0	85.7	76.0	73.5	70.5	79.6		64.0	50.7
Carbonate	<1	6.20	<1	6.20	<1	5.00	<1	5.00	<1		<1	15.20
Chloride	7.0	6.5	6.4	5.0	6.7	3.5	7.6	5.0	11.3		7.8	8.00
Cond.(umhos/cm)	497	483	429	417	431	421	460	468	691		517	481
Hardness	269	260	250	242	248	231	275	272			278	267
Iron	0.17	0.10	0.11	0.10	0.12	0.10	0.11	0.10	0.09		0.18	0.10
Magnesium	27.39	30.50	22.36	23.50	10.25	10.33	21.71	23.25	38.30		27.37	34.25
Mangenese	0.04	0.10	0.04	0.10	0.04	0.10	0.04	0.10	0.01		0.02	0.10
pH(units)	7.55	7.52	7.79	7.71	7.55	7.24	7.64	7.49	7.72		8.01	8.00
Potassium	1.59	1.00	2.55	1.00	2.42	2.50	3.01	1.00	1.54		2.06	1.00
Sodium	14.21	16.00	8.31	6.50	4.71	4.00	4.99	5.00	14.90		15.83	15.00
Sulfate	24.7	8.5	24.4	7.0	24.5	4.0	17.6	5.5	27.2		36.6	9.5
TDS	290	265	256	240	260	220	275	255	364		316	250

PARAMETER	79-29		79-35		80-44		[illegible]-46		82-52		84-56	
	Historical	1995	Historical	1995	Historical	1995	Historical	1995	Historical	1995	Historical	1995
Elevation	9410		9585		8980		9350		8995		9335	
Geologic Formation	TKn		Tf		Kpr		TKn		Kpr		TKn	
Bicarbonate	326	334	302	298	444	no samples during 1995	363	322	418	426	346	353
Calcium	48.0	39.2	85.7	78.6	100.1		62.0	60.0	76.0	71.5	63.2	58.7
Carbonate	<1	6.20	<1	5.60	<1		<1	5.00	1.30	5.00	1.00	6.20
Chloride	19.60	18.00	7.10	4.00	11.10		4.90	6.00	11.50	10.50	11.00	9.50
Cond.(umhos/cm)	539	530	427	433	868		553	499	644	653	539	527
Hardness	257	249	273	263	386		290	270	323	337	296	288
Iron	0.11	0.10	0.13	0.10	0.11		0.25	0.10	0.09	0.10	0.07	0.10
Magnesium	34.54	36.50	15.66	16.00	41.60		28.78	29.50	34.20	38.25	32.61	34.00
Mangenese	1.23	0.10	0.04	0.10	0.02		0.01	0.10	0.04	0.10	0.04	0.10
pH(units)	7.71	7.74	7.72	7.71	7.84		7.43	7.45	7.66	7.62	7.48	7.52
Potassium	3.06	1.00	1.48	1.00	35.90		0.82	1.00	1.81	1.00	1.56	1.00
Sodium	32.39	33.00	5.84	4.00	138.80		9.77	10.00	24.33	31.50	16.69	16.50
Sulfate	44.2	30.5	31.4	4.0	138.8		17.8	14.0	39.0	45.5	28.6	27.0
TDS	334	265	268	290	532		307	280	376	390	327	290

* Quality parameters reported as mg/l unless otherwise noted

B. Rilda Canyon - North Emery Water Users Association (NEWUA)

Of concern to PacifiCorp Fuel Resources is the proximity of proposed mining activities in Rilda Canyon to the Rilda Canyon Springs which currently serve as a culinary water source to the North Emery Water Users Association (NEWUA). The NEWUA spring system consists of a series of collection lines extending westward up Rilda Canyon and southward up a small side drainage (shown on Map HM-8 in Volume 9 of the PAP). The NEWUA spring system is metered at four locations. Meter 1 (Side Canyon Spring) is located at the downstream end of a collection line which enters Rilda Canyon from the South. Meter 2 (Side Canyon Spring plus South Spring) is located near the bottom of the main east-west trending collection line which lies to the south of Rilda Canyon Creek at a point just upstream (west) of the main spring collection box. Meter 2 records combined flows from both the Side Canyon (Meter 1) as well as additional inflows known as South Spring which enter the system below Meter 1. Meter 3 (North Spring) records flows for the east-west central collection line which was constructed through the central portions of the valley near Rilda Canyon Creek. Meter 4 (North Spring) collects data from the north collection line located on the north side of Rilda Canyon Creek. During 1995 flow from the north collection line was combined with the central collection system. As a result Meter 4 was terminated.

1. Spring Flow

Through the cooperative efforts of PacifiCorp and NEWUA flow meters were installed in September 1990 to isolate individual spring areas for quantity and quality (see Map HM-8 in Volume 9 of the PAP). Table 32 below lists the individual flow rates for meters 2 and 3 (flow from Meter 1 is included in Meter 2).

TABLE 32: NEWUA - RILDA CANYON SPRING FLOW (GPM)

DATE	METER 2	METER 3	METER 4	TOTAL
09-06-90	20.0	75.0	120.0	215.0
09-18-90	15.8	78.9	91.0	186.0
11-07-90	13.3	37.5*	20.0	71.0
11-14-90	14.5	67.4	9.3	91.0
11-19-90**	13.6	57.7	6.3	78.0
04-08-91	10.9	56.5	4.7	72.0
06-11-91	10.9	107.0	136.0	253.9
07-17-91	12.5	95.0	160.0	267.5
08-19-91	9.3	95.0	160.0	264.3
09-10-91	9.2	105.0	140.0	254.2
10-21-91	7.5	85.0	55.0	147.5
11-20-91	8.0	80.0	16.2	104.2
04-07-92	8.0	46.0	7.7	61.7
05-18-92	7.5	110.0	140.0	257.5
06-12-92	7.0	100.0	180.0	287.0
07-20-92	7.0	80.0	150.0	237.0
08-14-92	7.1	90.0	110.0	207.1
09-03-92	6.0	35.0	75.0	116.0
10-30-92	5.5	45.0	2.6	53.1
05-13-93	6.0	25.0	13.0	44.0
06-11-93	8.6	90.0	150.0	248.6
07-29-93	6.0	110.0	170.0	286.0
08-27-93	4.0	96.0	170.0	270.0
09-28-93	2.0	60.0	110.0	172.0
10-22-93	3.0	30.0	55.0	88.0
05-24-94	4.6	65.0	75.0	144.6
06-16-94	5.0	100.0	160.0	265.0
07-18-94	5.5	100.0	130.0	235.5
08-24-94	2.0	70.0	80.0	152.0
09-13-94	2.7	30.0	20.0	52.7
10-23-94	2.0	30.0	1.5	33.5
12-14-95	2.0	38	***	40.0
06-28-95	8.0	over capacity	***	
07-21-95	2.0	"	***	
08-24-95	4.0	"	***	
09-15-96	2.3	150	***	157.3
10-31-95	NEWUA conducting maintenance			
11-30-95	3.3	75	***	78.3

* Flow not stabilized.
** Data collected during pump test.
*** Diverted through Meter 3.

The seasonal variation of the monthly average flow from NEWUA's Rilda Canyon Springs is shown in Figure 4. With the installation of flow meters, individual spring contribution to the total flow can be plotted over time.

2. Quality

Baseline quality sampling of the individual springs was initiated upon completion of the spring meter system in September 1990 and continued quarterly throughout 1995. The minimum, maximum, and mean results of the 1995 spring flow compared to historical quality analysis are listed in Table 33. The raw data regarding the Rilda Springs sampled are contained in Appendix G. Values are in milligrams per liter unless otherwise noted. As stated in Volume 9 of the PAP, differences in the groundwater the quality data reflect differences in the groundwater source or the origin of groundwater for the various springs issuing within the Rilda Springs area. The higher sulfate and TDS concentrations from the Meter 2 samples are characteristic of waters associated with the Blackhawk Formation. Waters issuing from the North Spring collection system (Meters 3 and 4) area are of a better quality than waters from the Side Canyon and South Spring collection areas. Water issuing from the North Spring originates primarily from water moving within the alluvial valley sediments and fracture systems of the Starpoint Sandstone and is not derived from the Blackhawk Formation.

FIGURE 4
NORTH EMERY WATER USERS ASSOCIATION
RILDA CANYON SPRING FLOW

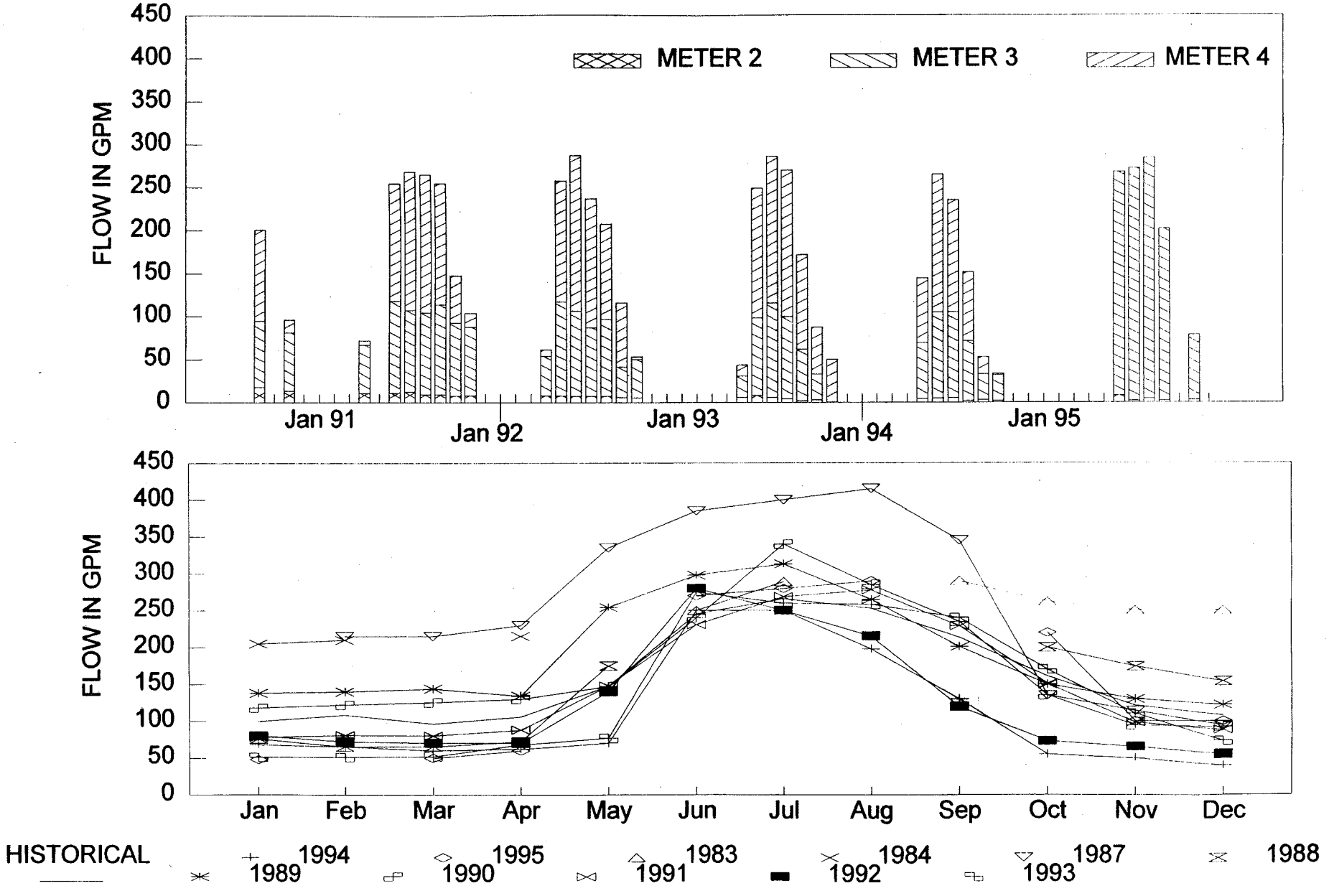


TABLE 33
NEWUA - RILDA CANYON SPRINGS
AVERAGE WATER QUALITY*

PARAMETER	METER 2		METER 3		METER 4	
	1995	Historical	1995	Historical	1995	Historical
Bicarbonate	403	441	373	399	Combined With Meter 3 in 1995	356
Calcium	77.5	94.5	71.5	81.6		70.3
Carbonate	5.0	0.7	6.2	0.7		0.7
Chloride	8.2	14.0	8.7	12.3		13.0
Cond.(umhos/cm)	695	728	655	613		535
Hardness	403	447	367	390		347
Iron	0.10	0.09	0.10	0.10		0.06
Magnesium	50.50	51.26	46.00	45.35		41.86
Mangenese	0.32	0.04	0.10	0.07		0.07
pH(units)	7.40	7.20	7.58	7.33		7.40
Potassium	2.25	2.87	2.00	1.89		2.13
Sodium	16.25	14.83	12.75	13.23		12.95
Sulfate	65.0	94.3	58.7	74.9		55.4
TDS	442	474	395	410		365

* Quality parameters reported as mg/l unless otherwise noted
Flow through Meter 4 was combined with Meter 3 in 1995

C. Trail Mountain

PacifiCorp began monitoring springs on Trail Mountain in 1993. Monitoring prior to 1993 was completed by the previous lease holders. The nine (9) springs listed below are monitored.

T-6 (18-2-1)	T-14 (17-25-1)
T-8 (17-21-1)	T-14A (17-26-5)
T-9 (17-22-1)	T-15 (17-35-1)
T-10 (17-26-4)	T-16 (17-35-2)
	TM-23 (17-14-4)

1. Flow and Sampling Schedule

a. Flow

All springs on the preceding list are measured during the months of July through October if weather and reasonable access permit.

b. Quality Samples

All springs listed above are sampled for water quality characteristics during the months of July through October. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.)

2. Spring Flow

As indicated early, precipitation and spring discharge rates increased from 1994 to 1995. Table 34 is a tabulation of the flow data collected during the 1995 monitoring season. The seasonal variation is represented in Table 34 under the column heading "Seasonal Net Change %." The percentage figures represent the amount of change, either positive or negative. The average change reveals a seventy-two percent (72%) [seventy-one percent (71%) by volume] decrease from the July to the October measurements (similar to East Mountain, see Table 26).

TABLE 34: TRAIL MOUNTAIN SPRINGS DISCHARGE (FLOW*/TEMP.**)

1995

Spring	July	August	September	October	Seasonal Net Change %
T-6 (18-2-1)	4.1/8	3.8/12	2.0/9	1.5/9	-63.4
T-8 (17-21-1)	1.7/6	0.8/8	0.6/9	0.4/8	-76.5
T-9 (17-22-1)	20.0/6	12.0/9	7.8/8	5.5/8	-72.5
T-10 (17-26-4)	0.4/15	damp	damp	damp	
T-14 (17-25-1)	2.0/8	1.2/14	<0.5	<0.5	-75.0
T-14A (17-26-5)	dry	dry	dry	dry	
T-15 (17-35-1)	1.2/7	0.7/10	0.6/11	0.7/9	
T-16 (17-35-2)	dry	dry	dry	dry	
TM-23	dry	dry	dry	dry	
			Net Change by Average		-71.9
			Net Change by Volume		-71

* All flow given in gallons per minute
** Temperatures reported in degrees centigrade

An eight-year comparison of spring discharge is shown in Table 35. The flow values for the individual springs represent the July measurements. October measurements were not utilized because winter weather conditions caused some springs to be inaccessible.

TABLE 35: TRAIL MOUNTAIN YEARLY SPRING DISCHARGE VARIATIONS (GPM)

JULY FLOW DATA

Spring	1988	1989	1990	1991	1992	*** 1993	1994	1995
T-6 (18-2-1)	11.0	0.5	0.50	1.20	0.03	6.0	1.6	4.1
T-8 (17-21-1)	4.7	0.2	0.25	Dry	0.14	1.7	0.2	1.7
T-9 (17-22-1)	8.0	0.2	0.10	Dry	2.50	40.0	4.0	20.0
T-10 (17-26-4)	4.7	Dry	0.15	Dry	Dry	0.4	Damp	0.4
T-14 (17-25-1)	5.0	Dry	Dry	Dry	Dry	1.6	Damp	2.0
T-14A (17-26-5)	10.0	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T-15 (17-35-2)	2.1	0.2	0.50	0.75	0.33	1.6	0.5	1.2
T-16 (17-35-2)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
T-23 (17-14-4)	22**	4.0*	Dry	Dry	Dry	Dry	Dry	Dry
TOTAL	67.5	5.1	1.50	1.95	2.67	51.3	6.3	29.4

* August measurement
** September measurement
*** First year monitored by PacifiCorp

3. Quality

To more closely identify springs which are related one with another, water samples were analyzed to determine the percentage of cations and anions in solution. The percentages have been graphically represented as cation-anion diagrams. (See Appendix H.) The purpose of the cation-anion diagram is to identify groups of related springs by water chemistry. To better visualize the concept, the cation-anion diagrams are presented by the geologic formation in which the spring originates. A general pattern for the geologic formations can be recognized for each year in which the cations/anions were analyzed. A consistent pattern for the North Horn is less obvious due to the complex geology of the formation itself. One aspect the cation-anion diagrams demonstrate is that, even though the quality varies slightly from individual sites as well as from different formations, seasonal variations do not exist.

The quality of the springs sampled in 1995 reveals an excellent correlation with historical averages. A summary of the water quality analysis for springs monitored on Trail Mountain is presented in Table 36. In the table the mean values for 1995 are compared to the historical results for each respective spring. The raw data regarding all springs sampled are contained in Appendix H.

Table 36: Trail Mountain Springs Water Quality (Historical vs. 1995) *

PARAMETER	18-2-1 Historical	18-2-1 1995	17-21-1 Historical	17-21-1 1995	17-22-1 Historical	17-22-1 1995	17-26-4 Historical	17-26-4 1995	17-25-1 Historical	17-25-1 1995	17-26-5 Historical	17-26-5 1995
Elevation	8395		9320		9210		8880		8155		9080	
Geologic Formation	TKn		TKn		TKn		TKn		Kcg		TKn	
Bicarbonate	402	405	399	390	347	295	393	400	473	415	398	no
Calcium	61.6	59.0	52.1	53.5	51.2	41.5	53.5	117.0	72.7	105.0	77.5	flow
Carbonate	0.70	5.00	0.60	5.00	2.70	5.00	4.00	5.00	2.00	5.00	0.00	during
Chloride	46.9	45.0	32.1	28.0	11.3	10.0	27.6	25.0	43.9	20.00	20.0	1995
Cond.(umhos/cm)	946	860	710	689	567	462	708	683	1414	1005	848	
Hardness	387	372	248	246	278	234	332	520	485	490	429	
Iron	0.10	0.10	0.10	0.10	0.12	0.10	0.12	0.10	0.13	0.10	0.45	
Magnesium	56.61	55.00	29.73	27.00	36.47	31.50	48.10	55.00	66.29	54.00	58.68	
Mangenese	0.04	0.10	0.05	0.10	0.07	0.10	0.12	0.20	0.03	0.10	0.02	
pH(units)	7.82	7.98	7.69	7.42	7.81	7.64	8.03	7.67	7.85	7.11	7.79	
Potassium	1.74	1.00	2.32	1.50	2.09	1.00	1.80	3.00	3.16	1.00	1.84	
Sodium	67.42	61.00	60.66	64.50	24.62	17.00	33.64	33.00	110.72	28.00	31.70	
Sulfate	135.0	114.0	18.7	14.0	23.7	12.0	34.1	30.0	292.5	200.0	141.6	
TDS	573	570	392	405	316	265	390	390	846	630	511	

PARAMETER	17-35-1 Historical	17-35-1 1995	17-35-2 Historical	17-35-2 1995	17-14-4 Historical	17-14-4 1995
Elevation	8880		9000		7880	
Geologic Formation	TKn		TKn		Alluvium	
Bicarbonate	379	390	No	No	362	No
Calcium	40.9	42.0	Flow	Flow	65.8	Samples
Carbonate	6.00	5.00		During	0.00	During
Chloride	42.70	40.50		1995	13.90	1995
Cond.(umhos/cm)	762	742			641	
Hardness	257	242			346	
Iron	0.74	0.10			0.19	
Magnesium	38.29	33.00			43.95	
Mangenese	0.07	0.10			0.02	
pH(units)	8.08	7.64			7.77	
Potassium	1.66	1.00			1.95	
Sodium	73.80	85.50			15.83	
Sulfate	44.3	42.0			61.8	
TDS	428	450			385	

TRAIL MOUNTAIN SPRINGS
CROSS REFERENCE

ARCO'S	ENERGY WEST
T-6	18-2-1
T-8	17-21-1
T-9	17-22-1
T-10	17-26-4
T-14	17-25-1
T-14A	17-26-5
T-15	17-35-1
T-16	17-35-2
TM-23	17-14-4

* Quality parameters reported as mg/l unless otherwise noted

V. MINE HYDROLOGY

A. Groundwater and Surface Water Sources in Relation to Mine Workings

The relationship of the Deer Creek, Cottonwood/Wilberg, and Trail Mountain mine workings with the overlying springs is shown in Map 5 (in pocket). Beginning in 1979 (Trail Mountain - 1992), PacifiCorp has developed an ambitious spring monitoring program with emphasis to detect changes in the East and Trail Mountain hydrologic regime as a result of mining. The data collected to date reveal no indication of any mine-related effects on spring discharge or surface flow rates. As expected, there is a direct relationship between annual precipitation, temperature, and spring discharge rates as previously discussed on pages 42 through 63 and shown in Figure 3.

B. Groundwater Quality and Collection Procedures

PacifiCorp began in-mine quality and quantity measurement in 1977 and has continued the measurement through 1995. With the collection of numerous samples throughout the extent of the mine workings the quality has remained relatively constant. (Refer to Cation/Anion dmagrams in Appendices G and H.

Collection procedures for groundwater quality consist of two grab samples (if measurable quantities exist) collected and analyzed per quarter at each of the mines which produces measurable quantities of water. Sampling according to this established plan began in the first quarter of 1982. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality except when new sites are established. In that case baseline information will be collected for two (2) years. (See Appendix Q.)

Long-term monitoring locations have been established at each of the mines which produces measurable quantities of water, i.e., Deer Creek, Cottonwood/Wilberg, and Trail Mountain

mines. (See Maps 3, 4, and 6 in pocket.) Four types of occurrences have been recognized to exist within the current mine workings. (Refer to Figure 5.)

1. Structural rolls with overlying fluvial channels,
2. Fault systems (Pleasant Valley and Roans Canyon),
3. Fractures and joints (lineaments),
4. Roof bolt and in-mine drill holes.

A collection device was installed at each long-term monitoring location. Flow and temperatures collected on a quarterly basis from the long-term sites in both mines were fairly consistent. (See appendices I, K, and M for the Deer Creek, Cottonwood/Wilberg, and Trail Mountain In-Mine hydrographs.)

C. Mine Water

1. Deer Creek Mine

a. In-Mine Water Production

The best estimate of in-mine water production was arrived at by combining the following values:

Deer Creek Discharge	643.0 Million Gallons
Estimated Evaporation*	18.9 Million Gallons
Domestic Usage	5.6 Million Gallons
Total Discharge	667.5 Million Gallons

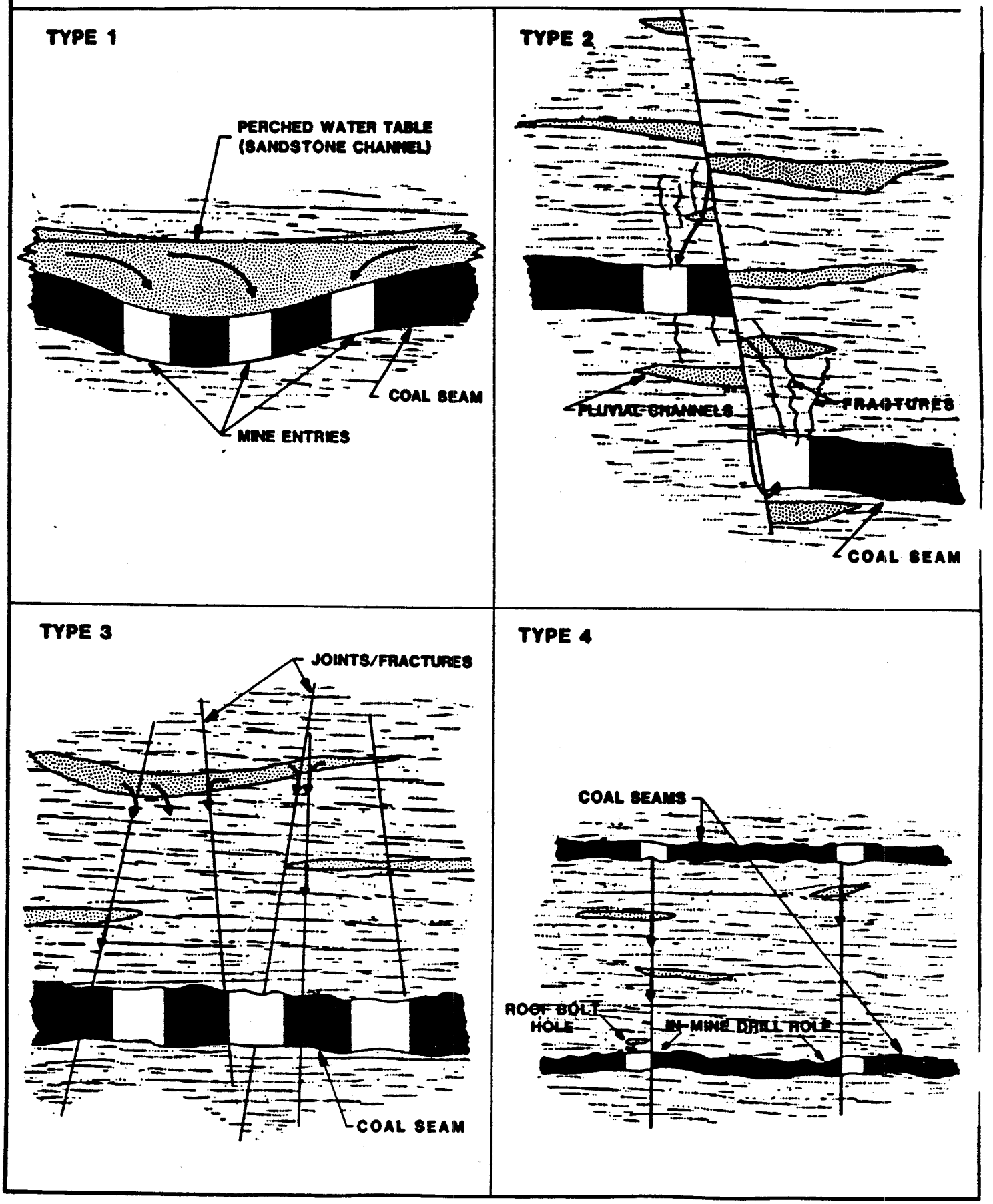
* See 1981 Hydrologic Monitoring Report

b. In-Mine Quality

Twelve samples were collected in the Deer Creek Mine in 1995. (See Map No. 2 in pocket for locations.) Parameters analyzed in 1995 are those listed in the DOGM Guidelines for Groundwater Baseline or Operational Quality. (See Appendix I.) Table 37 lists

FIGURE 5

LONG TERM WATER SOURCES



the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1995 to the historical values for each location. It is apparent from Table 37 that the average quality of the in-mine water has remained relatively constant. (Refer to Cation/Anion diagrams in Appendix I.) The complete chemical analysis of samples collected in 1995 can be found in Appendix I.

c. Discharge Quantity

Excess water not utilized in the mining operation or for domestic use was either pumped to storage areas or discharged from the mine. The locations of the main sump areas within the mine are shown in Figure 6. The largest volume of water is stored in the western part of Main West, which has not been actively mined for several years.

In-line flow meters are utilized to record the amount of water discharged from the mine, after which it passes through underground sedimentation sumps. Discharge from Deer Creek is either shipped directly to Huntington Power Plant or to the Deer Creek drainage in accordance with stipulations of the Deer Creek Discharge Permit UT-0023604-002.

The total water discharged from the Deer Creek Mine during 1995 was estimated at 1,973 acre feet, or 643.0 million gallons. The recorded flow of 1,973 acre feet during 1995 is a one hundred fifty-nine percent (159%) increase from the 1994 discharge of 761 acre feet. The average monthly discharges are shown in Figure 7.

TABLE 37: DEER CREEK I. . MINE WATER QUALITY *

1995 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
TW-10														
3-95	350	67.0	5.0	7.0	631	310	0.10	34.00	0.10	7.40	2.00	16.00	30.0	370
6-95	365	66.0	5.0	6.0	621	310	0.10	36.00	0.10	7.85	1.00	15.00	37.0	370
9-95	370	66.0	5.0	7.0	704	321	0.10	38.00	0.10	8.13	1.00	15.00	33.0	360
12-95	375	73.0	5.0	6.0	636	335	0.10	37.00	0.10	7.58	1.00	15.00	41.0	340
1995														
MIN	350	66.0	5.0	6.0	621	310	0.10	34.00	0.10	7.40	1.00	15.00	30.0	340
MAX	375	73.0	5.0	7.0	704	335	0.10	38.00	0.10	8.13	2.00	16.00	41.0	370
MEAN	365	68.0	5.0	6.5	648	319	0.10	36.25	0.10	7.74	1.25	15.25	35.3	360
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1988-1994														
MIN	279	61.3	0.0	0.0	450	279	0.01	18.70	0.01	6.60	0.01	9.81	27.00	313
MAX	714	211.0	5.0	30.0	950	732	1.17	77.10	1.21	8.40	5.00	55.03	350.00	439
MEAN	387	88.8	0.9	11.2	592	383	0.17	36.00	0.09	7.38	1.70	16.86	61.00	375
No. of Analysis	27	27	27	27	27	27	26	27	27	25	27	27	27	27
MN-ME**														
3-95	425	81.0	5.0	9.0	760	370	0.10	41.00	0.10	7.50	3.00	19.00	70.0	460
6-95	415	81.0	5.0	8.0	752	380	0.10	43.00	0.10	7.34	3.00	21.00	70.0	240
9-95	430	83.0	5.0	10.0	897	397	0.10	46.00	0.10	7.78	3.00	19.00	78.0	470
12-95	415	87.0	5.0	8.0	763	403	0.10	45.00	0.10	7.78	3.00	20.00	79.0	460
1995														
MIN	415	81.0	5.0	8.0	752	370	0.10	41.00	0.10	7.34	3.00	19.00	70.0	240
MAX	430	87.0	5.0	10.0	897	403	0.10	46.00	0.10	7.78	3.00	21.00	79.0	470
MEAN	421	83.0	5.0	8.8	793	387.5	0.10	43.75	0.10	7.60	3.00	19.75	74.3	408
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1991-1994														
MIN	335	72.6	0.1	4.0	500	343	0.01	38.60	0.01	6.90	0.74	16.00	40.0	366
MAX	442	100.0	5.0	25.0	764	432	2.81	49.60	0.20	7.59	14.00	37.16	110.0	470
MEAN	402	87.1	0.9	11.8	684	391	0.30	42.24	0.06	7.28	3.84	20.61	78.0	434
No. of Analysis	14	14	11	14	14	14	13	14	13	13	14	14	14	14

* Quality parameters are reported as mg/l unless otherwise noted.

** Sample site intiated during 1991.

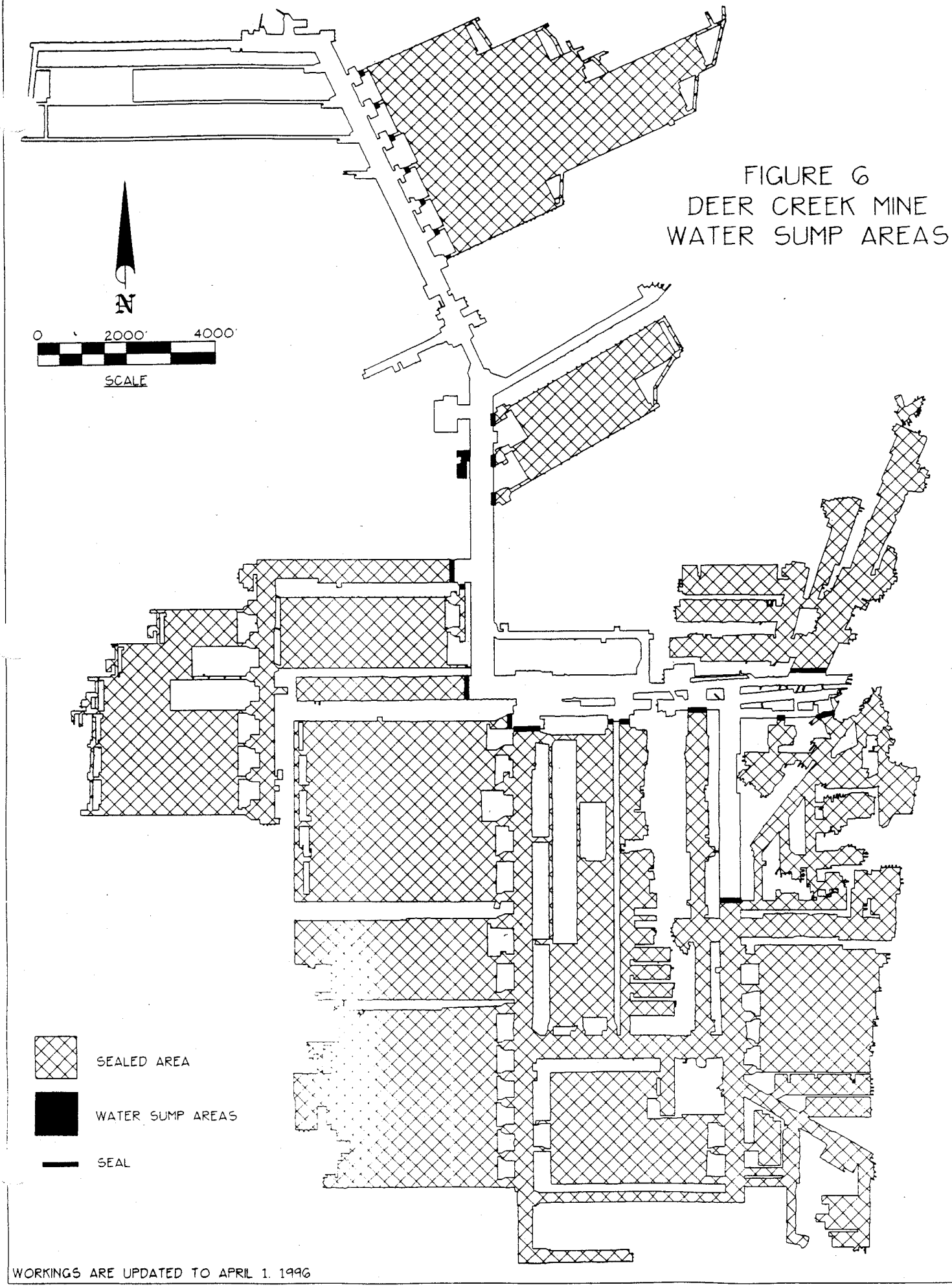
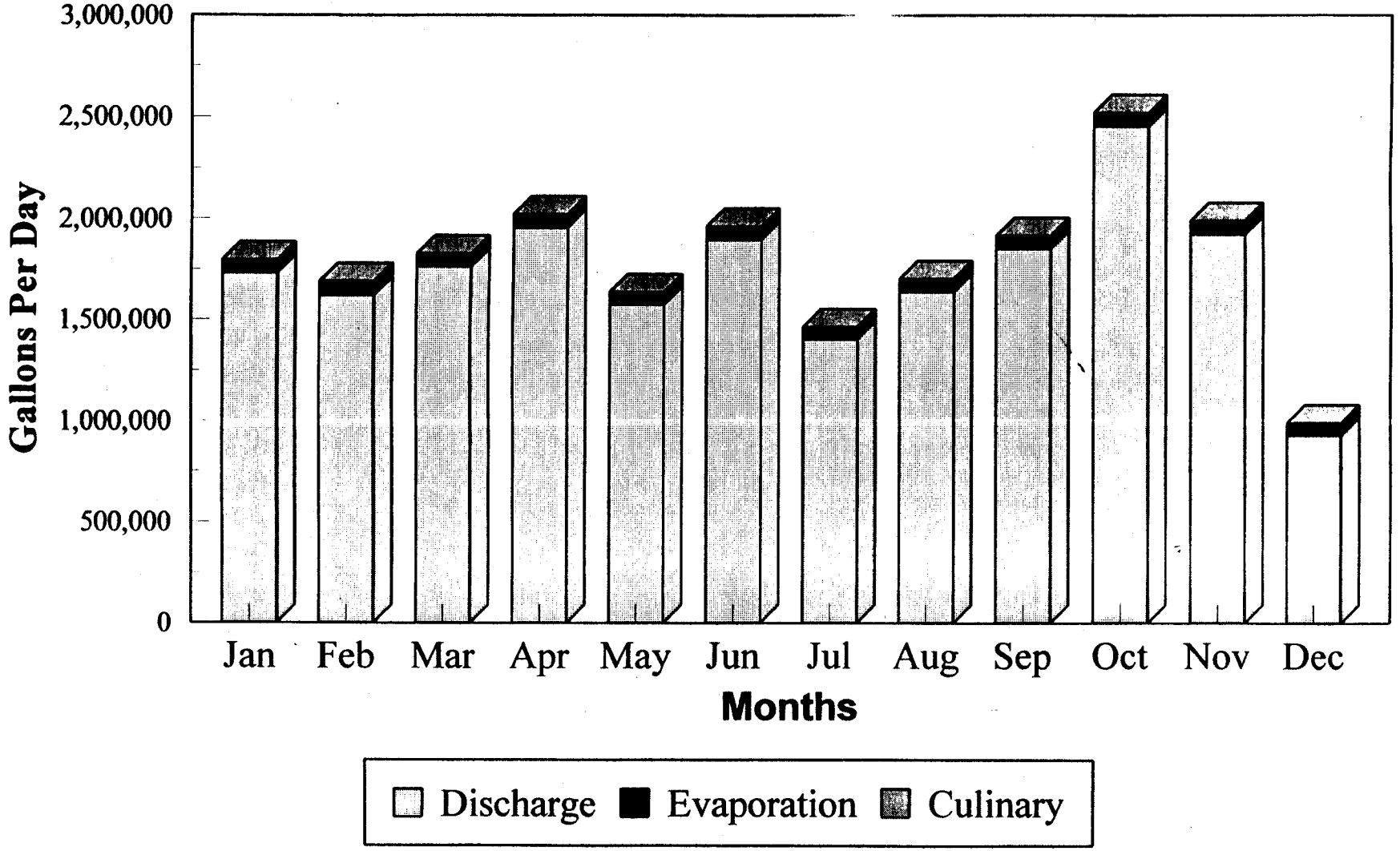


FIGURE 6
DEER CREEK MINE
WATER SUMP AREAS
N
0
2000'
4000'
SCALE
SEALED AREA
WATER SUMP AREAS
SEAL
WORKINGS ARE UPDATED TO APRIL 1. 1996

FIGURE 7

DEER CREEK MINE
1995 MINE WATER DISCHARGE



A graph displaying the historical discharge rates is included as Figure 8. The volume of water discharged from the mine has increased at a significant rate from 1988 through 1991 due to at least five factors. First, in previous years water discharged was measured with a Stevens Recorder installed in a Parshall flume. It was difficult to maintain calibration of the recorder and, in 1985, in-line flow meters (totalizer and instantaneous flow) were installed, allowing for a more accurate measurement of discharge. Second, mining has progressed into areas largely dominated by sandstone roof. The inflow from those areas is greater per acre of exposed area than areas of mudstone top. Third, mining has progressed into the bottom of the Straight Canyon Syncline, the lowest part of the mine, where a significant amount of water has been intersected. Fourth, mining has intersected the Roans Canyon Fault Graben which has released additional water into the mine workings. Last, prior to 1985 water used in mining was pumped directly from the in-mine sumps. Since that time all water has been pumped from the mine through the metering system. Mining water is then pumped back into the mine through a high-pressure steel line to the mining faces where it is utilized. Water production decreased significantly in 1992 with the sealing of the 4th South area.

d. Discharge Quality

Monthly water quality samples were collected for 1995. Table 38 compares the minimum, maximum, and mean values from an historical standpoint to 1995. An examination of Table 38 reveals excellent correlation with historical results. Individual analysis can be found in Appendix J.

FIGURE 8

DEER CREEK MINE DISCHARGE

January 1980 through December 1995

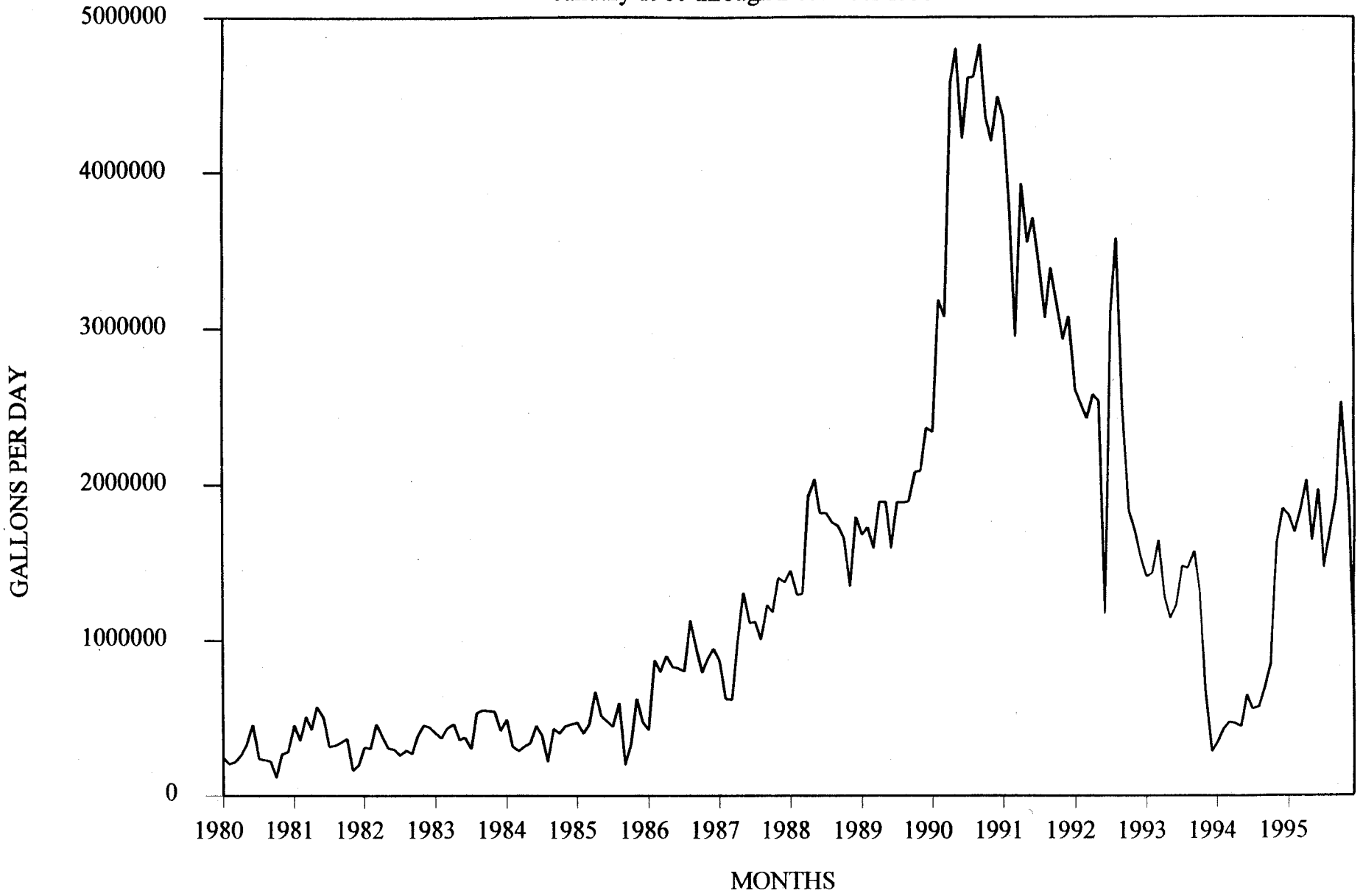


TABLE 38: DEER CREEK MINE - DISCHARGE WATER QUALITY*

Parameters	1995 Minimum	1995 Maximum	1995 Mean	Historical - (1976-1994) Minimum	Historical - (1976-1994) Maximum	Historical - (1976-1994) Mean
pH (units)	7.39	8.31	7.75	6.76	8.51	7.57
Acidity	10	40	19	0.1	97	11.1
Alkalinity	295	375	337.2	207	459	304.3
Chloride	12	50	22.6	0.7	60	17.1
Conductivity (umhos/cm)	712	1050	899	480	1900	892
Iron (Total)	0.4	3.7	1.02	0.01	7.53	0.49
Oil & Grease	<5.0	<5.0	<5.0	0.1	48.8	3
Sulfate	164	248	198.6	13	460	205.6
TDS	550	690	626	289	1088	594
TSS	5	120	40	0.1	2784	61.9

* Quality parameters reported as mg/l unless otherwise noted.

2. Des-Bee-Dove Mine

Production at the Des-Bee-Dove Mine was terminated indefinitely as of February 14, 1987. The portals were sealed and underground hydrologic monitoring was discontinued.

3. Wilberg/Cottonwood Mine

The mine fire which occurred in late 1984 altered normal hydrologic monitoring at the Wilberg Mine. Normal hydrologic monitoring was reinstated in late 1985 and continued through 1994.

a. In-Mine Water Production

In previous reports the in-mine water production was arrived at by combining mine discharge, domestic use, and evaporation. Due to the fire, normal coal production and usage were not experienced. Pre-fire coal production resumed during late 1985. A large part of the mine workings have been sealed since the fire. The locations of the sealed areas and sumps are shown on Figure 9. As reported

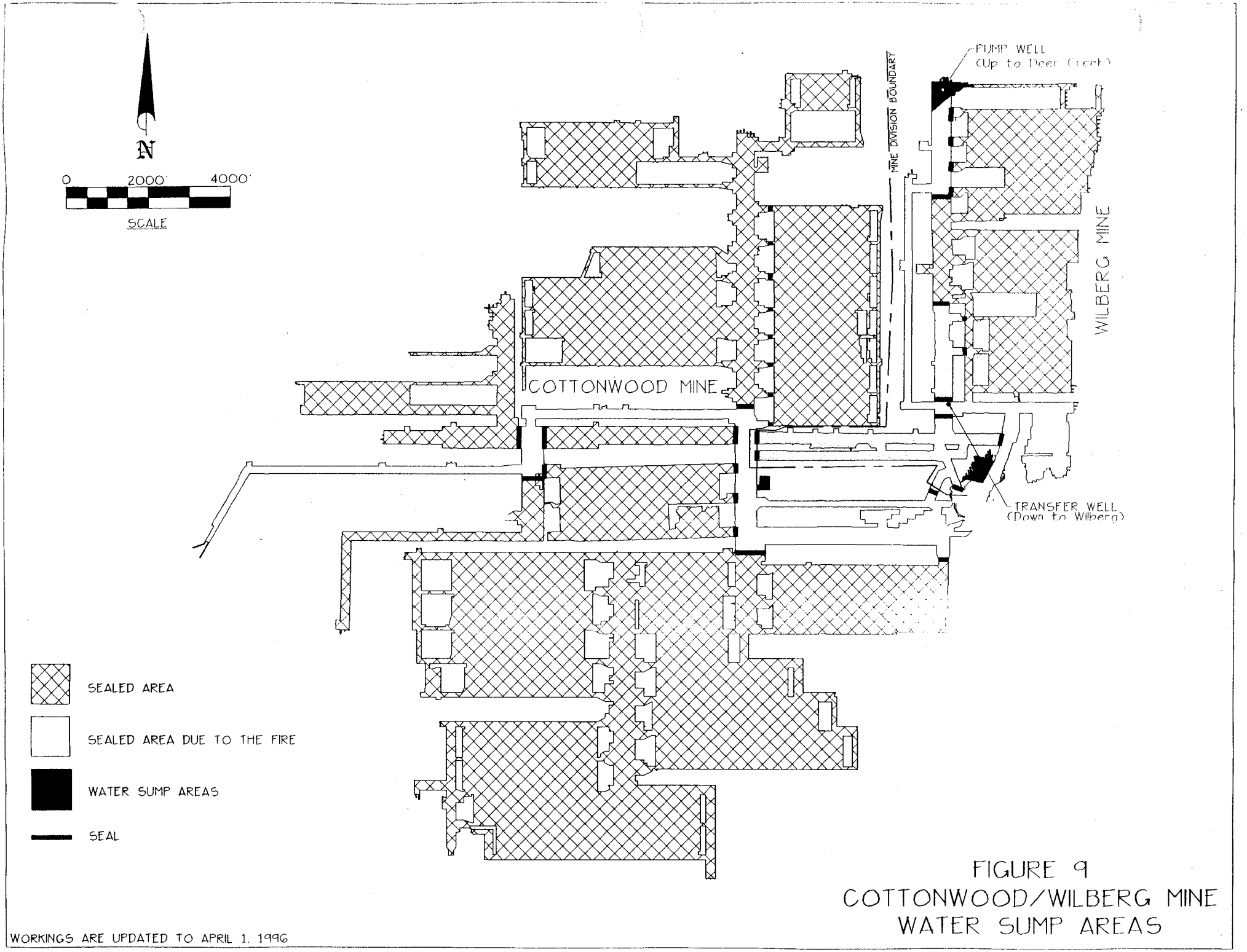


FIGURE 9
COTTONWOOD/WILBERG MINE
WATER SUMP AREAS

WORKINGS ARE UPDATED TO APRIL 1, 1996

in the 1984 Annual Report, water discharged from the Wilberg Mine complex includes the area designated as the Cottonwood Mine. (See Figure 10.) Consistent with previous years, the following table lists the factors involved in estimating in-mine water production.

Wilberg/Cottonwood Discharge

Grimes Wash	93.5 Million Gallons
Miller Canyon*	1.8 Million Gallons
Estimated Evaporation**	19.0 Million Gallons
Domestic Usage	1.6 Million Gallons
Total Discharge	115.9 Million Gallons

* Sealed ventilation breakout which intermittently discharges.
** See 1981 Hydrologic Monitoring Report.

b. In-Mine Quality

Eight samples were collected in the Wilberg/Cottonwood Mine in 1995. (See Map 5 in pocket for locations.) Parameters analyzed in 1995 are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Appendix Q.) Table 39 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1995 to the historical values. The average quality by location has remained relatively constant for each individual location. A complete chemical analysis of samples can be found in Appendix K.

FIGURE 10

WILBERG/COTTONWOOD MINE DISCHARGE

APRIL 1979 THROUGH DECEMBER 1995

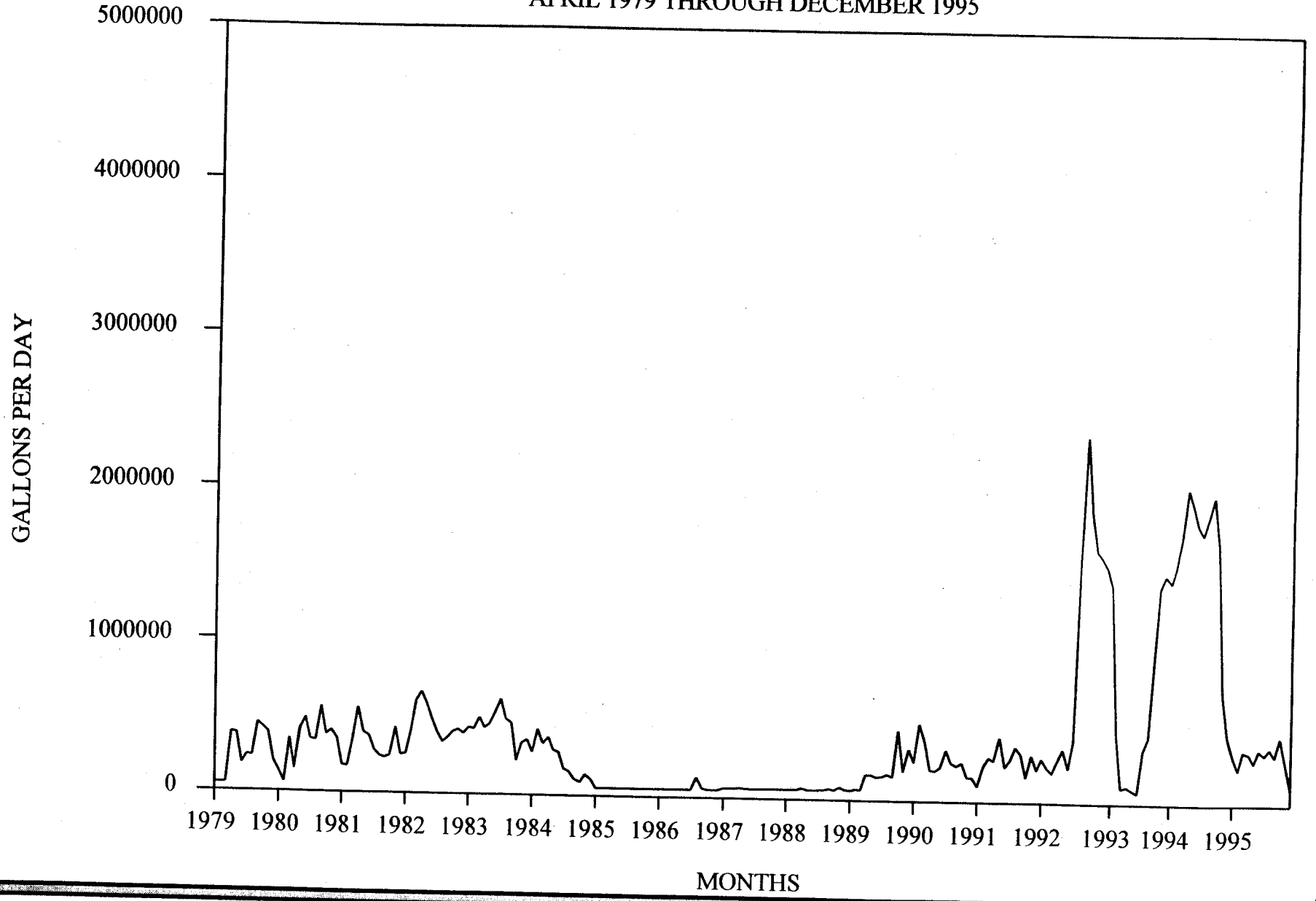


TABLE 39: WILBERG/COTTONWOOD IN-MINE WATER QUALITY *

1995 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
2S XC-11														
3-95	555	180.0	5.0	16.0	1498	920	0.10	114.00	0.10	7.10	5.00	24.00	340.0	1080
6-95	580	162.0	5.0	16.0	1505	840	0.10	105.00	0.10	7.26	4.00	23.00	400.0	1100
9-95	600	173.0	5.0	17.0	1523	934	0.10	122.00	0.10	6.98	4.00	25.00	386.0	1110
12-95	590	174.0	5.0	15.0	1546	900	0.10	113.00	0.10	7.00	4.00	21.00	347.0	1100
1995														
MIN	555	162.0	5.0	15.0	1498	840	0.10	105.00	0.10	6.98	4.00	21.00	340.0	1080
MAX	600	180.0	5.0	17.0	1546	934	0.10	122.00	0.10	7.26	5.00	25.00	400.0	1110
MEAN	581	172.3	5.0	16.0	1518	898.5	0.10	113.50	0.10	7.09	4.25	23.25	368.3	1097.5
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1983-1994														
MIN	403	116.0	0.1	9.6	1000	725	0.01	5.40	0.01	6.50	0.30	5.80	250.0	664
MAX	676	330.0	5.0	160.0	2600	1022	0.30	134.40	0.20	8.05	7.40	36.90	690.0	1328
MEAN	533	173.2	1.0	24.7	1464	873	0.10	104.92	0.03	7.31	4.19	22.56	420.9	1009
No. of Analysis	33	36	29	35	36	33	32	36	33	36	35	36	36	36
TMA XC-32														
3-95	390	130.0	5.0	15.0	1276	650	0.10	79.00	0.10	7.30	8.00	37.00	370.0	900
6-95	400	124.0	5.0	15.0	1282	640	0.10	80.00	0.10	7.51	7.00	37.00	380.0	920
9-95	436	123.0	5.0	16.0	1256	637	0.10	80.00	0.10	7.28	7.00	37.00	327.0	890
12-95	430	116.0	5.0	15.0	1256	615	0.10	79.00	0.10	8.20	6.00	35.00	347.0	850
1995														
MIN	390	116.0	5.0	15.0	1256	615	0.10	79.00	0.10	7.28	6.00	35.00	327.0	850
MAX	436	130.0	5.0	16.0	1282	650	0.10	80.00	0.10	8.20	8.00	37.00	380.0	920
MEAN	414	123.3	5.0	15.3	1268	636	0.10	79.50	0.10	7.57	7.00	36.50	356.0	890
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1994														
MIN	379	126.0	1.0	12.0	1319	630	0.10	77.00	0.10	7.13	7.00	33.00	350.0	920
MAX	431	133.0	5.0	17.0	1334	688	0.20	90.00	0.20	8.06	8.00	35.00	410.0	960
MEAN	407	129.5	2.0	14.5	1329	667	0.18	83.25	0.13	7.47	7.50	34.50	387.5	942.5
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4

* Quality parameters are reported as mg/l unless otherwise noted.

c. Discharge Quantity

Water produced in the Wilberg Mine gravity flows to the northern area of 1st North. At that point it can either be pumped by a vertical turbine located in the Deer Creek Mine which picks up the water and pumps it back to the south and down to the Wilberg Mine main sump or pumped directly to the main sump utilizing submersible pumps. Water produced in the Cottonwood Mine (2nd North area) is transferred to the Wilberg Mine sump. The sump, which functions as a settling basin, effectively removes settleable solids from the water. A portion of the water is redistributed to various areas of the mine to be utilized in the mining operations. A total of 93.5 million gallons was discharged to Grimes Wash during 1995; and intermittent small quantity discharges did occur at the Miller Canyon breakouts, which were developed for ventilation purposes but sealed in 1987. (See Figure 11.) Intermittent discharges usually occur throughout the year with a flow rate ranging from 4 to 6 GPM. Discharge from Miller Canyon is monitored in accordance with stipulations of the Wilberg Mine Discharge Permit UT-0022896-04. Approximately 1.8 million gallons were discharged during 1995.

d. Discharge Quality

Samples are collected each month from Grimes Wash and Miller Canyon breakouts whenever discharge occurs. Monthly samples were collected from both the Grimes Wash and Miller Canyon locations during 1995. Table 40 compares the minimum, maximum, and mean values from 1995 to the historical values.

TABLE 40: WILBERG/COTTONWOOD - DISCHARGE WATER QUALITY*

GRIMES WASH

Parameters	1995 Minimum	1995 Maximum	1995 Mean	Historical - (1976-1994) Minimum	Historical - (1976-1994) Maximum	Historical - (1976-1994) Mean
pH (units)	7.42	8.0	7.73	6.9	8.47	7.66
Acidity	10	60	16	0.1	62	7.5
Alkalinity	300	330	320	163	442	282.8
Chloride	11	15	12.3	0.6	80	16.8
Conductivity (umhos/cm)	801	1019	870	490	1590	963
Iron, Total	0.1	1.1	0.63	0.01	3.0	0.28
Oil & Grease	<5.0	<5.0	<5.0	0.1	23.8	2.0
Sulfate	80	200	157.6	29.2	600	234.9
TDS	540	610	585	407	1287	608
TSS	<4.0	10.0	5.5	0.1	222	7.5

MILLER CANYON

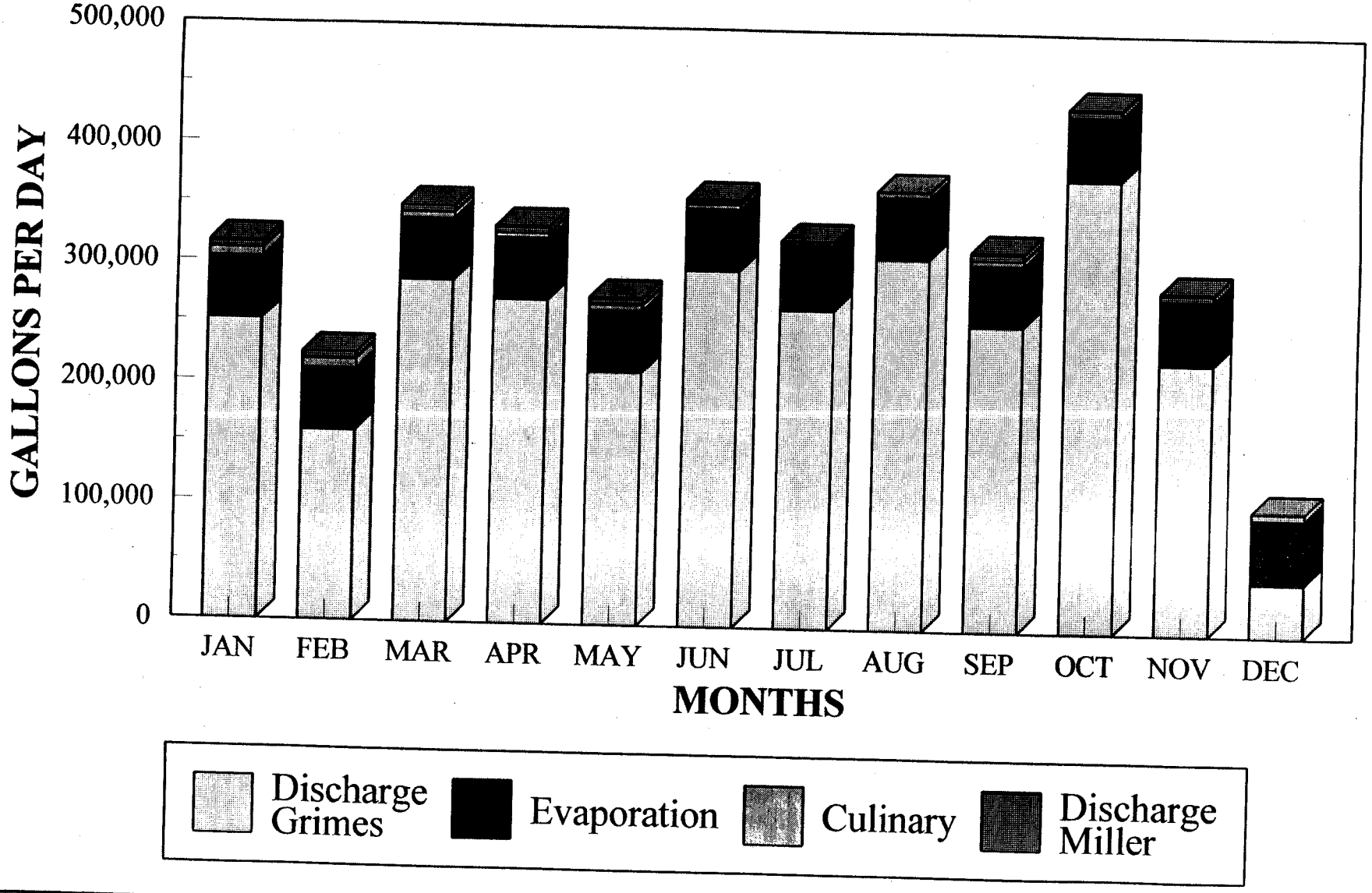
Parameters	1995 Minimum	1995 Maximum	1995 Mean	Historical - (1976-1994) Minimum	Historical - (1976-1994) Maximum	Historical - (1976-1994) Mean
pH (units)	7.1	8.83	7.65	6.4	8.51	7.26
Acidity	10	100	30	0.1	98	19.6
Alkalinity	300	365	343.3	219	445	333.1
Chloride	16	16	16	10	155	23.4
Conductivity (umhos/cm)	1003	1392	1220	480	1900	1208
Iron, Total	<0.1	<0.2	0.11	0.01	1.38	0.25
Oil & Grease	<5.0	<5.0	<5.0	0.1	7.2	1.9
Sulfate	354	460	407.3	200	680	415.9
TDS	920	980	953	413	1182	917
TSS	5.0	5.0	5.0	0.1	32	4.7

* Quality parameters reported as mg/l unless otherwise noted.

FIGURE 11

WILBERG/COTTONWOOD

1995 MINE WATER DISCHARGE



4. Trail Mountain Mine

a. In-Mine Water Production

The best estimate of in-mine water production was arrived at by combining the following values:

Trail Mountain Discharge	0.0 Million Gallons
Estimated Evaporation	7.8 Million Gallons
Domestic Usage	2.2 Million Gallons
Total Discharge	10.0 Million Gallons

b. In-Mine Quality

Four samples were collected in the Trail Mountain Mine in 1995. (See Map 6 in pocket for locations.) Site UG-2 was terminated in 1995 due to insufficient flow. Parameters analyzed in 1995 are those listed in the DOGM Guidelines for Groundwater Baseline or Operational Quality. (See Appendix Q.) Table 41 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 1995 to the historical values for each location. It is apparent from Table 41 that the average quality of the in-mine water has remained relatively constant. (Refer to Cation/Anion diagrams in Appendix M.)

TABLE 41: TRAIL MOUNTAIN IN-MINE WATER QUALITY *

1995 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
UG-3														
3-95	260	31.0	5.0	8.0	533	170	0.10	23.00	0.10	7.80	4.00	50.00	22.0	320
6-95	260	35.0	25.0	10.0	535	200	0.10	27.00	0.10	7.59	3.00	48.00	24.0	320
9-95	275	33.0	15.0	12.0	539	185	0.10	25.00	0.10	8.00	3.00	46.00	29.0	320
12-95	310	32.0	5.0	10.0	542	179	0.10	24.00	0.10	8.18	3.00	42.00	23.0	320
1995														
MIN	260	31.0	5.0	8.0	533	170	0.10	23.00	0.10	7.59	3.00	42.00	22.0	320
MAX	310	35.0	25.0	12.0	542	200	0.10	27.00	0.10	8.18	4.00	50.00	29.0	320
MEAN	276	32.8	12.5	10.0	537	184	0.10	24.75	0.10	7.89	3.25	46.50	24.5	320
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1985 - 94														
MIN	274	26.0	0.1	2.0	380	151	0.03	19.60	0.03	7.41	2.10	48.00	16.5	252
MAX	344	49.3	8.4	15.0	696	222	0.20	29.00	0.20	8.48	5.00	61.00	130.0	424
MEAN	301	35.6	3.3	7.9	540	183	0.13	22.96	0.09	8.06	3.72	52.54	45.1	314
No. of Analysis	16	16	8	16	16	16	9	16	7	16	16	16	16	16

* Quality parameters are reported as mg/l unless otherwise noted.

c. Discharge Quantity

Water produced in the Trail Mountain Mine either is pumped or gravity flows to a sump located in 4th Left. A portion of the water is redistribruted to various areas of the mine to be utilized in the mining operations. Excess water not used in the mining operations is stored in sealed areas of the mine or discharged to Cottonwood Canyon Creek. No water was discharged from Trail Mountain Mine in 1995. Discharge from Trail Mountain is monitored in accordance with stipulations of the Trail Mountain Mine Discharge Permit UTG040003-002.

d. Discharge Quality

Samples are collected each month from Trail Mountain Mine whenever discharge occurs. No water discharged during 1995 from the Trail Mountain Mine. Appendix N includes monitoring completed at the sealed Oliphant Mine portals.

VI. PIEZOMETRIC GRADIENT INFORMATION

A. Surface

1. Cottonwood Canyon Creek

Eight (8) wells located along the extent of Cottonwood Canyon Creek are monitored monthly except TM-3, which is monitored quarterly. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
CCCW-1A	Alluvial Deposits
CCCW-1S	Starpoint Sandstone
CCCW-2A	Alluvial Deposits
CCCW-3A	Alluvial Deposits
CCCW-3S U	Blackhawk - Fluvial Sandstone
CCCW-3S L	Starpoint Sandstone
EM-31	Lower Blackhawk/Starpoint Sandstone
TM-1B	Starpoint Sandstone
TM-3 (Straight Canyon)	Starpoint Sandstone

Hydrographs of the surface wells can be found in Appendix O.

2. Rilda Canyon

Six (6) wells located in Rilda Canyon are monitored monthly when accessible. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
P-1	Alluvial Deposits
P-4	Alluvial Deposits
P-5	Alluvial Deposits
P-6	Alluvial Deposits
P-7	Alluvial Deposits
EM-47	Lower Blackhawk/Starpoint Sandstone

Information collected during 1995 correlated well with historical information. Hydrographs for the individual wells can be found in Appendix O.

B. In-Mine

1. Deer Creek

Four (4) long-term monitoring wells were completed during 1989. (See Map 2 for well locations.) Due to changes in the mine layout only one well remained active during 1995. Water levels remained relatively constant during 1995. (See Appendix I.)

2. Cottonwood Mine

During 1989 four holes were drilled in the Cottonwood Mine. Monitoring of the long-term wells, WCP 1-3, was discontinued in 1992 due to the sealing of the 3rd South area.

VII. WASTE ROCK WELLS

A. Deer Creek Mine - Waste Rock Storage Facility

The Deer Creek Waste Rock Storage Facility is located on the northeast side of State Highway 31 approximately six (6) miles west of Huntington, Utah.

The geology of the Deer Creek Waste Rock Storage Facility is fairly simple and straightforward. The site is located on the southern flanks of Gentry Mountain in the area just south of Wild Horse Ridge. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the east and west is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the proposed Deer Creek Waste Rock Storage Facility.

The test wells completed prior to construction identified the existence of a limited quantity of groundwater locally in the Masuk Shale. The water is most likely flowing along fractures in the strata. The rate of water migration has been shown to be extremely slow (< 100 feet per year); therefore, the proposed operations to be conducted at the waste rock site should not impact the hydrology of the area. The weathered Masuk Shale present on and near the ground surface will act as an effective barrier to prevent the surface waters from migrating to depths and intersecting groundwater.

The groundwater present in the terrace gravels should not be impacted by the waste rock site because it is located at a higher elevation than the proposed site.

In order to identify the groundwater quality characteristics of the waste rock storage facility one of the test wells completed prior to the construction of the site was developed into a long-term water monitoring well. (See Map 1 for location.)

Four samples were collected in 1995. The analysis, along with water depth, is listed in Table 42. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix O. It is a well known fact that the Mancos Shale typically contains large quantities of soluble minerals such as gypsum; therefore, any water passing through it will be naturally high in dissolved solids. Samples at the waste rock well verify this condition.

B. Cottonwood/Wilberg Mines - Waste Rock Storage Facility

The Cottonwood/Wilberg Waste Rock Storage Facility is located on the west side of the Wilberg Mine road approximately 1.5 miles south of the Wilberg Mine.

The geology of the proposed waste rock site is fairly simple and straightforward. The site is located on the southern flank of East Mountain to the south of Newberry Canyon. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the north and east is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the proposed waste rock site.

In order to identify the groundwater quality characteristics of the waste rock storage facility one of the test wells completed prior to the construction of the site was developed into a long-term water monitoring well. (See Map 1 for location.)

TABLE 42: WELLS - WATER QUALITY *

1995 SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
DEER CREEK - DCWR-1														
3-95	725	151.0	5.0	870.0	20800	1420	0.10	252.00	0.10	7.99	17.00	7130.00	13000.0	21800
6-95	740	145.0	15.0	120.0	23100	1540	0.10	285.00	0.10	7.52	16.00	7490.00	14000.0	21920
9-95	750	146.0	5.0	884.0	18600	1390	0.10	249.00	0.10	7.78	14.00	7120.00	11705.0	21760
12-95	800	157.0	5.0	756.0	23200	1463	0.10	260.00	0.10	7.97	15.00	7800.00	13144.0	21710
1995														
MIN	725	145.0	5.0	120.0	18600	1390	0.10	249.00	0.10	7.52	14.00	7120.00	11705.0	21710
MAX	800	157.0	15.0	884.0	23200	1540	0.10	285.00	0.10	7.99	17.00	7800.00	14000.0	21920
MEAN	754	149.8	7.5	657.5	21425	1453.25	0.10	261.50	0.10	7.82	15.50	7385.00	12962.3	21797.5
HISTORICAL 1989-1994:														
MIN	626	142.2	0.0	206.0	17300	951	0.05	57.00	0.01	7.34	13.00	5165.00	6000.0	11466
MAX	935	880.1	5.0	1140.0	45000	3351	1.74	351.00	0.20	8.21	43.80	9978.00	18000.0	24189
MEAN	757	267.7	0.9	855.3	26041	1640	0.36	236.07	0.06	7.71	24.18	6957.83	13318.7	21255
No. of Analysis	23	24	24	24	24	24	20	24	24	24	24	24	24	24
WILBERG/COTTONWOOD - WCWR-1														
3-95	320	230.0	5.0	3800.0	23100	3760	0.10	774.00	0.10	7.86	38.00	4340.00	9000.0	21340
6-95	315	223.0	10.0	3700.0	23200	4770	0.10	1024.00	0.10	7.47	28.00	6040.00	11000.0	22720
9-95	305	202.0	5.0	3488.0	22200	3972	0.10	842.00	0.10	7.65	24.00	5360.00	7386.0	8760
12-95	335	223.0	5.0	3675.0	22100	3901	0.10	812.00	0.10	7.89	24.00	5170.00	7579.0	17410
1995														
MIN	305	202.0	5.0	3488.0	22100	3760	0.10	774.00	0.10	7.47	24.00	4340.00	7386.0	8760
MAX	335	230.0	10.0	3800.0	23200	4770	0.10	1024.00	0.10	7.89	38.00	6040.00	11000.0	22720
MEAN	319	219.5	6.3	3665.8	22650	4101	0.10	863.00	0.10	7.72	28.50	5227.50	8741.3	17557.5
HISTORICAL 1989-1994:														
MIN	305	132	0	280	10666	1629	0.05	137.7	0.02	6.9	8	851	750	8714
MAX	863	1135	5	4020	120000	8327	9	1717	2.48	8.33	119.1	8812	24000	30440
MEAN	502	448.1	0.8	1466.2	32385	4308	0.89	753.7	0.39	7.62	48.27	5225.26	12406.5	20225
No. of Analysis	23	23	23	23	23	23	19	23	23	23	23	23	23	23
TRAIL MOUNTAIN TM-1B														
12-95	950	14.0	10.0	717.0	4580	72	0.10	9.00	0.10	8.69	3.00	1316.00	664.0	3290
1995														
MIN	950	14.0	10.0	717.0	4580	72	0.10	9.00	0.10	8.69	3.00	1316.00	664.0	3290
MAX	950	14.0	10.0	717.0	4580	72	0.10	9.00	0.10	8.69	3.00	1316.00	664.0	3290
MEAN	950	14.0	10.0	717.0	4580	72	0.10	9.00	0.10	8.69	3.00	1316.00	664.0	3290
HISTORICAL 1985-1994:														
MIN	304	2.4	1.0	68.6	1050	18	0.05	2.00	0.01	8.64	3.00	230.60	4.0	632
MAX	960	5.0	164.0	142.0	1981	53	0.20	10.70	0.20	9.55	15.70	545.00	35.0	1120
MEAN	618	4.0	86.2	100.8	1658	30	0.15	5.15	0.08	9.10	8.85	372.20	21.5	878
No. of Analysis	4	4	4	4	3	3	4	4	4	4	4	4	4	4

* Quality parameters are reported as mg/l unless otherwise noted.

Four samples were collected in 1995. The analysis, along with water depth, is listed in Table 42. Values are in milligrams per liter unless otherwise noted. Complete raw data can be found in Appendix O. It is a well known fact that the Mancos Shale typically contains large quantities of soluble minerals such as gypsum; therefore, any water passing through it will be naturally high in dissolved solids. Samples at the waste rock well verify this condition.

VIII. EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

Since the development of the PacifiCorp mining complex on East and Trail mountains, coal has been extracted causing the partial collapse of the immediate overburden strata and, ultimately, surface subsidence. This occurs in areas of retreat mining in room and pillar sections and in areas of longwall mining. All areas with potential for subsidence are monitored annually. (See annual Subsidence Monitoring reports.)

The springs and surface waters above all areas of mine workings are being monitored closely to measure the effects of mining. No mining-related changes to the springs or surface waters have been identified in the data collected. The water flowing into the mine workings, although temporarily diverted or detained, has not had an impact on the surface waters of East and Trail mountains or the surrounding area.

IX. SUMMARY

PacifiCorp has been conducting a water monitoring program in the area of its underground coal mines in Emery County, Utah in accordance with federal and state regulations. The program has been in existence since 1977, and this is the sixteenth annual report submitted concerning the hydrology.

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The pattern changed in 1985 with conditions returning to slightly above normal. During the 1986 water year the extremely wet trend returned, and the upper Colorado River Basin experienced above average precipitation. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992 and returned in 1994. Runoff improved substantially in 1993 and 1995 with above average flow conditions occurring in most drainages.

The data collected in 1995 continued to show the relationship between the variation in surface water quantity and precipitation, but the hydrologic monitoring completed on East and Trail mountains to date has failed to identify any change in the quantity or quality of ground or surface water which can be attributed to mining present on the East and Trail Mountain properties.

APPENDIX A

UTAH POWER & LIGHT COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

AY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	49.00	19.00	21.00	12.00	18.00	17.00	21.00	61.00	250.00	513.00	112.00	75.00	1
2	47.00	22.00	19.00	14.00	18.00	18.00	22.00	96.00	282.00	474.00	108.00	80.00	2
3	52.00	18.00	19.00	16.00	16.00	17.00	21.00	82.00	281.00	542.00	107.00	91.00	3
4	50.00	17.00	20.00	17.00	16.00	17.00	21.00	73.00	302.00	452.00	107.00	77.00	4
5	38.00	18.00	20.00	19.00	16.00	18.00	24.00	81.00	363.00	393.00	109.00	78.00	5
6	38.00	17.00	19.00	18.00	18.00	17.00	26.00	73.00	453.00	330.00	106.00	85.00	6
7	35.00	18.00	17.00	15.00	20.00	19.00	27.00	66.00	337.00	239.00	104.00	81.00	7
8	33.00	18.00	12.00	16.00	21.00	20.00	29.00	67.00	278.00	225.00	124.00	80.00	8
9	35.00	17.00	11.00	15.00	22.00	20.00	25.00	78.00	229.00	226.00	124.00	81.00	9
0	36.00	17.00	13.00	16.00	20.00	19.00	23.00	95.00	196.00	238.00	132.00	82.00	10
1	33.00	18.00	16.00	18.00	18.00	22.00	22.00	97.00	221.00	242.00	144.00	85.00	11
2	23.00	20.00	16.00	15.00	18.00	22.00	23.00	110.00	292.00	241.00	148.00	81.00	12
3	24.00	19.00	18.00	20.00	17.00	21.00	25.00	89.00	392.00	213.00	144.00	98.00	13
4	27.00	14.00	18.00	18.00	18.00	20.00	28.00	83.00	461.00	193.00	145.00	96.00	14
5	29.00	14.00	17.00	18.00	12.00	22.00	26.00	92.00	456.00	178.00	137.00	98.00	15
6	29.00	18.00	17.00	17.00	18.00	22.00	28.00	111.00	370.00	164.00	78.00	98.00	16
7	31.00	14.00	17.00	15.00	21.00	26.00	27.00	160.00	323.00	165.00	87.00	101.00	17
8	31.00	17.00	17.00	17.00	21.00	24.00	25.00	156.00	271.00	158.00	66.00	104.00	18
9	27.00	17.00	18.00	15.00	19.00	30.00	26.00	173.00	298.00	145.00	73.00	102.00	19
0	26.00	15.00	16.00	14.00	19.00	26.00	25.00	208.00	336.00	142.00	80.00	113.00	20
1	24.00	18.00	17.00	19.00	18.00	26.00	25.00	261.00	384.00	128.00	81.00	118.00	21
2	24.00	12.00	16.00	17.00	18.00	26.00	24.00	287.00	413.00	123.00	116.00	116.00	22
3	24.00	10.00	18.00	14.00	16.00	24.00	24.00	270.00	442.00	122.00	120.00	118.00	23
4	25.00	11.00	19.00	18.00	13.00	25.00	24.00	223.00	460.00	122.00	81.00	120.00	24
5	27.00	13.00	18.00	18.00	13.00	24.00	26.00	202.00	455.00	120.00	79.00	118.00	25
6	24.00	14.00	17.00	17.00	14.00	24.00	29.00	173.00	494.00	117.00	81.00	115.00	26
7	19.00	11.00	16.00	16.00	17.00	22.00	31.00	161.00	558.00	115.00	79.00	117.00	27
8	20.00	12.00	17.00	13.00	17.00	22.00	34.00	147.00	628.00	115.00	86.00	120.00	28
9	20.00	11.00	20.00	13.00	0.00	22.00	39.00	146.00	614.00	112.00	76.00	108.00	29
0	20.00	15.00	16.00	15.00	0.00	22.00	78.00	155.00	490.00	112.00	68.00	113.00	30
1	19.00	0.00	12.00	20.00	0.00	21.00	0.00	207.00	0.00	111.00	72.00	0.00	31
ONTHLY													
OT	939.00	474.00	527.00	505.00	492.00	675.00	828.00	4283.00	11329.00	6770.00	3174.00	2949.00	
EA	30.30	15.80	17.00	16.30	17.60	21.80	27.60	138.00	378.00	218.00	102.00	98.30	
AX	52.00	22.00	21.00	20.00	22.00	30.00	78.00	287.00	628.00	542.00	148.00	120.00	
IN	19.00	10.00	11.00	12.00	12.00	17.00	21.00	61.00	196.00	111.00	66.00	75.00	
CR FT	1860.00	940.00	1050.00	1000.00	976.00	1340.00	1640.00	8500.00	22470.00	13430.00	6300.00	5850.00	

OCT94-SEPT95 TOTAL 32945.00 MEAN 90.30 MAX 628.00 MIN 10.00 TOT ACR FT 65350.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 750.00 CFS DATE JUN 29 MIN UNIT DISCHARGE 10.00 CFS DATE NOV 22
(4.41 FT)

REMARKS:

Unpublished records
Subject to revision

UTAH POWER & LIGHT COMPANY

STREAM DISCHARGE RECORDS

DAILY DISCHARGE (CFS)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	13.00	10.00	13.00	13.00	12.00	13.00	14.00	17.00	21.00	16.00	19.00	53.00	1
2	13.00	11.00	13.00	13.00	13.00	13.00	14.00	18.00	21.00	16.00	17.00	53.00	2
3	13.00	11.00	13.00	13.00	13.00	13.00	15.00	18.00	21.00	16.00	17.00	53.00	3
4	13.00	12.00	13.00	13.00	13.00	13.00	15.00	18.00	21.00	16.00	16.00	52.00	4
5	13.00	12.00	13.00	13.00	14.00	13.00	15.00	18.00	21.00	16.00	16.00	55.00	5
6	13.00	12.00	13.00	12.00	14.00	13.00	16.00	18.00	18.00	16.00	16.00	59.00	6
7	13.00	12.00	13.00	12.00	13.00	13.00	16.00	19.00	17.00	16.00	16.00	56.00	7
8	13.00	12.00	13.00	12.00	13.00	13.00	14.00	19.00	17.00	16.00	16.00	56.00	8
9	13.00	12.00	13.00	12.00	13.00	14.00	14.00	19.00	16.00	16.00	17.00	56.00	9
10	13.00	12.00	12.00	12.00	14.00	14.00	13.00	18.00	16.00	16.00	17.00	57.00	10
11	13.00	11.00	12.00	12.00	14.00	14.00	13.00	18.00	15.00	17.00	17.00	57.00	11
12	14.00	11.00	12.00	12.00	12.00	15.00	14.00	19.00	15.00	17.00	17.00	69.00	12
13	14.00	12.00	12.00	12.00	12.00	15.00	14.00	20.00	15.00	17.00	17.00	74.00	13
14	14.00	12.00	12.00	12.00	12.00	15.00	14.00	19.00	15.00	17.00	18.00	73.00	14
15	13.00	12.00	12.00	12.00	12.00	16.00	14.00	18.00	15.00	17.00	18.00	73.00	15
16	13.00	12.00	12.00	13.00	12.00	16.00	14.00	18.00	15.00	18.00	18.00	73.00	16
17	13.00	12.00	12.00	13.00	12.00	16.00	14.00	18.00	15.00	18.00	16.00	73.00	17
18	12.00	12.00	12.00	13.00	11.00	16.00	14.00	18.00	15.00	19.00	16.00	73.00	18
19	10.00	12.00	12.00	13.00	11.00	17.00	14.00	18.00	15.00	19.00	16.00	83.00	19
20	10.00	12.00	12.00	13.00	11.00	16.00	14.00	18.00	17.00	18.00	16.00	90.00	20
21	10.00	12.00	12.00	13.00	11.00	16.00	15.00	17.00	17.00	17.00	17.00	89.00	21
22	10.00	12.00	12.00	13.00	11.00	15.00	14.00	17.00	17.00	17.00	17.00	88.00	22
23	10.00	12.00	12.00	13.00	11.00	15.00	14.00	18.00	17.00	18.00	17.00	88.00	23
24	9.90	12.00	12.00	13.00	12.00	15.00	14.00	19.00	16.00	18.00	17.00	89.00	24
25	9.80	12.00	12.00	13.00	12.00	16.00	15.00	21.00	16.00	18.00	16.00	89.00	25
26	9.70	11.00	12.00	13.00	12.00	16.00	15.00	21.00	17.00	18.00	16.00	86.00	26
27	9.60	11.00	12.00	13.00	12.00	16.00	14.00	21.00	17.00	19.00	16.00	87.00	27
28	9.50	11.00	13.00	13.00	13.00	17.00	15.00	21.00	17.00	19.00	16.00	82.00	28
29	9.50	12.00	13.00	13.00	0.00	17.00	16.00	21.00	17.00	19.00	37.00	79.00	29
30	9.60	12.00	12.00	13.00	0.00	14.00	17.00	21.00	17.00	19.00	50.00	78.00	30
31	9.80	0.00	12.00	12.00	0.00	13.00	0.00	21.00	0.00	19.00	52.00	0.00	31
MONTHLY													
TOT	363.40	351.00	383.00	392.00	345.00	458.00	434.00	584.00	509.00	538.00	607.00	2143.00	
MEA	11.70	11.70	12.40	12.60	12.30	14.80	14.50	18.80	17.00	17.40	19.60	71.40	
MAX	14.00	12.00	13.00	13.00	14.00	17.00	17.00	21.00	21.00	19.00	52.00	90.00	
MIN	9.50	10.00	12.00	12.00	11.00	13.00	13.00	17.00	15.00	16.00	16.00	52.00	
ACR FT	721.00	696.00	760.00	778.00	684.00	908.00	861.00	1160.00	1010.00	1070.00	1200.00	4250.00	

OCT94-SEPT95 TOTAL 7107.40 MEAN 19.50 MAX 90.00 MIN 9.50 TOT ACR FT 14100.00

TOTAL MEAN MAX MIN TOT ACR FT

MAX UNIT DISCHARGE 90.00 CFS (2.03 FT) DATE SEP 20 MIN UNIT DISCHARGE 2.70 CFS DATE JUN 6

REMARKS:

UTAH POWER & LIGHT COMPANY

RESERVOIR RECORDS

DAILY CONTENTS (ACRE FEET)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	13720.00	13472.00	13131.00	12807.00	12569.00	12317.00	12186.00	12566.00	17729.00	26840.00	27480.00	26610.00	1
2	13715.00	13465.00	13124.00	12800.00	12569.00	12312.00	12182.00	12646.00	18154.00	26939.00	27451.00	26525.00	2
3	13690.00	13453.00	13112.00	12800.00	12513.00	12308.00	12177.00	12681.00	18580.00	27080.00	27434.00	26435.00	3
4	13690.00	13436.00	13100.00	12798.00	12490.00	12303.00	12172.00	12718.00	19065.00	27171.00	27409.00	26338.00	4
5	13685.00	13424.00	13093.00	12798.00	12478.00	12301.00	12191.00	12774.00	19554.00	27238.00	27392.00	26241.00	5
6	13683.00	13412.00	13081.00	12795.00	12471.00	12296.00	12227.00	12819.00	20086.00	27292.00	27367.00	26132.00	6
7	13673.00	13397.00	13069.00	12786.00	12467.00	12291.00	12252.00	12854.00	20481.00	27342.00	27338.00	26031.00	7
8	13666.00	13380.00	13060.00	12777.00	12467.00	12287.00	12266.00	12906.00	20478.00	27388.00	27313.00	25923.00	8
9	13654.00	13366.00	13050.00	12767.00	12460.00	12282.00	12289.00	12946.00	21070.00	27438.00	27288.00	25811.00	9
10	13642.00	13351.00	13043.00	12770.00	12455.00	12278.00	12301.00	13029.00	21290.00	27468.00	27267.00	25704.00	10
11	13625.00	13339.00	13043.00	12770.00	12455.00	12273.00	12317.00	13134.00	21535.00	27539.00	27250.00	25597.00	11
12	13612.00	13337.00	13036.00	12763.00	12432.00	12271.00	12347.00	13256.00	21888.00	27548.00	27233.00	25463.00	12
13	13598.00	13330.00	13024.00	12751.00	12420.00	12266.00	12363.00	13332.00	22398.00	27573.00	27213.00	25317.00	13
14	13595.00	13315.00	13017.00	12749.00	12411.00	12262.00	12372.00	13404.00	22920.00	27594.00	27192.00	25180.00	14
15	13593.00	13301.00	13005.00	12746.00	12404.00	12257.00	12390.00	13496.00	23381.00	27607.00	27179.00	25044.00	15
16	13593.00	13296.00	12998.00	12734.00	12395.00	12252.00	12393.00	13605.00	23767.00	27615.00	27154.00	24904.00	16
17	13583.00	13299.00	12986.00	12723.00	12388.00	12248.00	12395.00	13781.00	24098.00	27619.00	27150.00	24769.00	17
18	13574.00	13296.00	12970.00	12711.00	12381.00	12243.00	12397.00	13962.00	24382.00	27624.00	27125.00	24627.00	18
19	13569.00	13287.00	12960.00	12699.00	12374.00	12241.00	12409.00	14178.00	24474.00	27628.00	27092.00	24481.00	19
20	13564.00	13275.00	12946.00	12690.00	12365.00	12236.00	12418.00	14489.00	24939.00	27628.00	27067.00	24310.00	20
21	13557.00	13260.00	12939.00	12678.00	12358.00	12232.00	12427.00	14810.00	25188.00	27628.00	27055.00	24139.00	21
22	13552.00	13244.00	12930.00	12662.00	12351.00	12227.00	12430.00	15048.00	25404.00	27624.00	27042.00	23962.00	22
23	13547.00	13232.00	12918.00	12655.00	12349.00	12223.00	12437.00	15291.00	25621.00	27615.00	27042.00	23779.00	23
24	13542.00	13220.00	12904.00	12648.00	12340.00	12218.00	12437.00	15535.00	25502.00	27607.00	27042.00	23626.00	24
25	13532.00	13205.00	12894.00	12643.00	12333.00	12216.00	12437.00	15784.00	25633.00	27602.00	27030.00	23437.00	25
26	13525.00	13200.00	12882.00	12636.00	12324.00	12211.00	12444.00	16033.00	25795.00	27586.00	27009.00	23282.00	26
27	13520.00	13191.00	12873.00	12622.00	12321.00	12207.00	12455.00	16288.00	25951.00	27573.00	26984.00	23099.00	27
28	13511.00	13189.00	12861.00	12611.00	12317.00	12202.00	12469.00	16543.00	26496.00	27556.00	26951.00	22949.00	28
29	13501.00	13174.00	12842.00	12594.00	0.00	12198.00	12483.00	16804.00	26614.00	27539.00	26889.00	22826.00	29
30	13491.00	13160.00	12831.00	12583.00	0.00	12193.00	12539.00	17065.00	26737.00	27522.00	26799.00	22681.00	30
31	13479.00	0.00	12821.00	12576.00	0.00	12188.00	0.00	17333.00	0.00	27501.00	26696.00	0.00	31
MONTHLY CHANGE	0.	-319.	-339.	-245.	-259.	-129.	351.	4794.	9404.	764.	-805.	-4015.	

OCT94-SEPT95 TOTAL CHANGE 9202. MAX CONTENTS 27628. AC FT JUL 19 MIN CONTENTS 12172. AC FT APR 4

TOTAL CHANGE MAX CONTENTS MIN CONTENTS

REMARKS:

Note: Electric Lake peaked on 7/20/95 at 8566.88

UTAH POWER & LIGHT COMPANY

DAILY GAGE HEIGHT (FEET)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	224.07	223.05	221.63	220.26	219.24	218.15	217.58	219.23	239.04	264.99	266.53	264.43	1
2	224.05	223.02	221.60	220.23	219.24	218.13	217.56	219.57	240.47	265.23	266.46	264.22	2
3	223.95	222.97	221.55	220.23	219.00	218.11	217.54	219.72	241.88	265.57	266.42	264.00	3
4	223.95	222.90	221.50	220.22	218.90	218.09	217.52	219.88	243.45	265.79	266.36	263.76	4
5	223.93	222.85	221.47	220.22	218.85	218.08	217.60	220.12	245.00	265.95	266.32	263.52	5
6	223.92	222.80	221.42	220.21	218.82	218.06	217.76	220.31	246.65	266.08	266.26	263.25	6
7	223.88	222.74	221.37	220.17	218.80	218.04	217.87	220.46	247.85	266.20	266.19	263.00	7
8	223.85	222.67	221.33	220.13	218.80	218.02	217.93	220.68	247.84	266.31	266.13	262.73	8
9	223.80	222.61	221.29	220.09	218.77	218.00	218.03	220.85	249.60	266.43'	266.07	262.45	9
10	223.75	222.55	221.26	220.10	218.75	217.98	218.08	221.20	250.24	266.50	266.02	262.18	10
11	223.68	222.50	221.26	220.10	218.75	217.96	218.15	221.64	250.95	266.67	265.98	261.91	11
12	223.63	222.49	221.23	220.07	218.65	217.95	218.28	222.15	251.96	266.69	265.94	261.57	12
13	223.57	222.46	221.18	220.02	218.60	217.93	218.35	222.47	253.40	266.75	265.89	261.20	13
14	223.56	222.40	221.15	220.01	218.56	217.91	218.39	222.77	254.85	266.80	265.84	260.85	14
15	223.55	222.34	221.10	220.00	218.53	217.89	218.47	223.15	256.11	266.83	265.81	260.50	15
16	223.55	222.32	221.07	219.95	218.49	217.87	218.48	223.60	257.15	266.85	265.75	260.14	16
17	223.51	222.33	221.02	219.90	218.46	217.85	218.49	224.32	258.03	266.86	265.74	259.79	17
18	223.47	222.32	220.95	219.85	218.43	217.83	218.50	225.06	258.78	266.87	265.68	259.42	18
19	223.45	222.28	220.91	219.80	218.40	217.82	218.55	225.93	259.02	266.88	265.60	259.04	19
20	223.43	222.23	220.85	219.76	218.36	217.80	218.59	227.17	260.23	266.88	265.54	258.59	20
21	223.40	222.17	220.82	219.71	218.33	217.78	218.63	228.43	260.87	266.88	265.51	258.14	21
22	223.38	222.10	220.78	219.64	218.30	217.76	218.64	229.35	261.42	266.87	265.48	257.67	22
23	223.36	222.05	220.73	219.61	218.29	217.74	218.67	230.28	261.97	266.85	265.48	257.18	23
24	223.34	222.00	220.67	219.58	218.25	217.72	218.67	231.20	261.67	266.83	265.48	256.77	24
25	223.30	221.94	220.63	219.56	218.22	217.71	218.67	232.13	262.00	266.82	265.45	256.26	25
26	223.27	221.92	220.58	219.53	218.18	217.69	218.70	233.05	262.41	266.78	265.40	255.84	26
27	223.25	221.88	220.54	219.47	218.17	217.67	218.75	233.98	262.80	266.75	265.34	255.34	27
28	223.21	221.87	220.49	219.42	218.15	217.65	218.81	234.90	264.15	266.71	265.26	254.93	28
29	223.17	221.81	220.41	219.35	0.00	217.63	218.87	235.83	264.44	266.67	265.11	254.59	29
30	223.13	221.75	220.36	219.30	0.00	217.61	219.11	236.75	264.74	266.63	264.89	254.19	30
31	223.08	0.00	220.32	219.27	0.00	217.59	0.00	237.68	0.00	266.58	264.64	0.00	31

MAXIMUM GAGE HEIGHT 266.88 JUL 19 MINIMUM GAGE HEIGHT 217.52 APR 4

NOTE: ADD 8300 FEET TO GAGE HEIGHT TO OBTAIN ELEVATION

UTAH POWER & LIGHT COMPANY

RESERVOIR RECORDS

EVAPORATION (ACRE FEET)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	DAY
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.00	4.00	2.00	1
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.00	3.00	2.00	2
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.00	3.00	2.00	3
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.00	3.00	2.00	4
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	5
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	6
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	7
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	8
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	9
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	10
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	11
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	12
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	13
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	14
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	15
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	16
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	17
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	18
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	19
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	20
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	21
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	22
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	23
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	4.00	3.00	2.00	24
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	25
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	26
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	27
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	28
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	29
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	3.00	2.00	30
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	3.00	0.00	31
MONTHLY													
TOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.00	120.00	94.00	60.00	
MEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.23	3.87	3.03	2.00	
MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	4.00	4.00	2.00	
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.00	3.00	2.00	

OCT94-SEPT95 TOTAL 341. MEAN 1. MAX 4. MIN 2.

TOTAL MEAN MAX MIN

REMARKS:

Note: Electric Lake peaked on 7/20/95 at 8566.88

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FAX: (801) 653-2436

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/12/95

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE Huntington Canyon Creek HCC01

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 4.4°C
Flow NA
Rec'd 1630 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS
pH ~~8.32~~ 8.57
Conductivity 441
DO 3.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14862

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	200	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	185	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	4.70	----	meq/l	---------	---------- ----- --
Calcium, Total	54	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	4.90	----	meq/l	---------	---------- ----- --
Chloride	14	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	457	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	220	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	21	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	5.4	----	mg/l	EPA 360.1	03-29-1995 1335 ED
pH	8.47	----	pH units	EPA 150.1	03-29-1995 1630 ED
Potassium, Total	2	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	11	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-30-1995 0730 SW
Solids, Total Dissolved	210	10	mg/l	EPA 160.1	03-30-1995 0800 SW
Solids, Total Suspended	10	5	mg/l	EPA 160.2	03-31-1995 0800 SW
Sulfate	24	1	mg/l	EPA 375.4	04-06-1995 0900 SW
Turbidity	1.8	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Mont CD

Manager, Huntington Laboratory

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April 11, 1995

RECEIVED
4/12/95

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 4.4°C
Flow NA
Rec'd 1630 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS

pH	~~8.32~~ 8.57
Conductivity	441
DO	3.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14862

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1120 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15147

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	195	5	mg/l as HCO_3	SM2320-B	07-06-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	07-06-1995 1400 SW
Alkalinity, Total	170	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1400 SW
Anions	3.80	----	meq/l	---------	---------- ----- --
Calcium, Total	57	1	mg/l	EPA 215.1	07-11-1995 1100 MK
Cations	4.30	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	314	1	umhos/cm	SM2510-B	07-12-1995 0740 MK
Hardness, Total	200	10	mg/l as $CaCO_3$	SM2340-B	07-11-1995 1100 MK
Iron, Total	1.4	0.1	mg/l	EPA 236.1	07-11-1995 1140 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Magnesium, Total	15	1	mg/l	EPA 242.1	07-11-1995 1120 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-11-1995 1200 MK
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	7.4	----	mg/l	EPA 360.1	06-30-1995 1550 MK
pH	8.10	----	pH units	EPA 150.1	06-30-1995 1510 MK
Potassium, Total	1	1	mg/l	EPA 258.1	07-11-1995 1235 MK
Sodium, Total	4	1	mg/l	EPA 273.1	07-11-1995 1245 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-30-1995 1400 MK
Solids, Total Dissolved	170	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	70	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	7	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	25.0	0.1	NTU	EPA 180.1	06-30-1995 1410 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/059/95
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FAX: (801) 653-2436

July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01

Kind of sample reported to us Water

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1120 hr.

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

NOTE: Dissolved metals filtered at Lab.

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15147

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	5.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

HCC01
Temperature 11.6°C
Flow NA
Rec'd 1515 hr.
Sampled 1125 hr.

FIELD MEASUREMENTS

pH	8.76
Conductivity	287
DO	6.6
Turbidity	24

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Analysis report no. 59-15438

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
lkalinity, Bicarbonate	165	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Total	145	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400 SW
Anions	3.6	----	meq/l	---------	---------- ----- --
Calcium, Total	47	1	mg/l	EPA 215.1	09-28-1995 1200 MK
Cations	3.6	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	323	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	167	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200 MK
Iron, Total	0.6	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	12	1	mg/l	EPA 242.1	09-28-1995 1300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	6.7	----	mg/l	EPA 360.1	09-18-1995 1500 BR
pH	8.21	----	pH units	EPA 150.1	09-18-1995 1700 BR
Potassium, Total	1	1	mg/l	EPA 258.1	09-28-1995 1000 MK
Sodium, Total	6	1	mg/l	EPA 273.1	09-28-1995 1030 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-18-1995 1545 MK
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	10-10-1995 1030 JC
Solids, Total Suspended	35	5	mg/l	EPA 160.2	09-22-1995 1030 JC
Sulfate	14	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	18.0	0.1	NTU	EPA 180.1	09-18-1995 1545 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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FAX: (801) 653-2436

October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

HCC01
Temperature 11.6°C
Flow NA
Rec'd 1515 hr.
Sampled 1125 hr.

FIELD MEASUREMENTS

pH	8.76
Conductivity	287
DO	6.6
Turbidity	24

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Analysis report no. 59-15438

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	0.5	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 3.7°C
Flow NA
Rec'd 1600 hr.
Sampled 1426 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	400
DO	9.2

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15714

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-15-1995 0630 SW
Alkalinity, Bicarbonate	255	5	mg/l as HCO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Total	210	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1030 SW
Anions	5.0	----	meq/l	---------	---------- ----- --
Calcium, Total	55	1	mg/l	EPA 215.1	12-15-1995 1530 MK
Cations	4.9	----	meq/l	---------	---------- ----- --
Chloride	10	1	mg/l	SM4500-Cl-B	12-27-1995 0700 SW
Conductivity	450	1	umhos/cm	SM2510-B	12-15-1995 1615 SW
Hardness, Total	228	10	mg/l as $CaCO_3$	SM2340-B	12-15-1995 1530 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Magnesium, Total	22	1	mg/l	EPA 242.1	12-15-1995 1600 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-18-1995 1015 MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-21-1995 0900 JC
Oxygen, Dissolved	8.1	----	mg/l	EPA 360.1	12-14-1995 1730 BR
pH	8.50	----	pH units	EPA 150.1	12-14-1995 1700 BR
Potassium, Total	1	1	mg/l	EPA 258.1	12-18-1995 1045 MK
Sodium, Total	8	1	mg/l	EPA 273.1	12-18-1995 1100 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-15-1995 0700 MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	12-15-1995 0730 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	12-15-1995 1200 JC
Sulfate	29	1	mg/l	EPA 375.4	12-28-1995 1200 SW
Turbidity	2.2	0.1	NTU	EPA 180.1	12-15-1995 0700 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JAN - 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC01
Temperature 3.7°C
Flow NA
Rec'd 1600 hr.
Sampled 1426 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	400
DO	9.2

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15714

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-1.3	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

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Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 4.7°C
Flow NA
Rec'd 1630 hr.
Sampled 1540 hr.

FIELD MEASUREMENTS

pH	8.51
Conductivity	442
DO	3.8

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14869

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	205	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	190	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	4.80	----	meq/l	---------	---------- ----- --
Calcium, Total	57	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	5.00	----	meq/l	---------	---------- ----- --
Chloride	14	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	460	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	20	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-06-1995 1530 LM
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	03-29-1995 1335 ED
pH	8.30	----	pH units	EPA 150.1	03-29-1995 1630 ED
Potassium, Total	2	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	11	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-30-1995 0730 SW
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	03-30-1995 0800 SW
Solids, Total Suspended	10	5	mg/l	EPA 160.2	03-31-1995 0800 SW
Sulfate	26	1	mg/l	EPA 375.4	04-06-1995 0900 SW
Turbidity	1.7	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout CD

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

April 11, 1995

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PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 4.7°C
Flow NA
Rec'd 1630 hr.
Sampled 1540 hr.

FIELD MEASUREMENTS

pH	8.51
Conductivity	442
DO	3.8

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14869

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1125 hr.

NOTE: Dissolved metals filtered at Lab. Due to high TSS, sample would not balance.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15146

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	190	5	mg/l as HCO_3	SM2320-B	07-06-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	07-06-1995 1400 SW
Alkalinity, Total	165	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1400 SW
Anions	3.80	----	meq/l	---------	---------- ----- --
Calcium, Total	64	1	mg/l	EPA 215.1	07-11-1995 1100 MK
Cations	4.70	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	317	1	umhos/cm	SM2510-B	07-12-1995 0740 MK
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	07-11-1995 1100 MK
Iron, Total	1.6	0.1	mg/l	EPA 236.1	07-11-1995 1140 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Magnesium, Total	16	1	mg/l	EPA 242.1	07-11-1995 1120 MK
Manganese, Total	1.0	0.1	mg/l	EPA 243.1	07-11-1995 1200 MK
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	7.4	----	mg/l	EPA 360.1	06-30-1995 1550 MK
pH	7.97	----	pH units	EPA 150.1	06-30-1995 1510 MK
Potassium, Total	1	1	mg/l	EPA 258.1	07-11-1995 1235 MK
Sodium, Total	4	1	mg/l	EPA 273.1	07-11-1995 1245 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-30-1995 1400 MK
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	100	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	10	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	25.0	0.1	NTU	EPA 180.1	06-30-1995 1410 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/059/95
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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1125 hr.

NOTE: Dissolved metals filtered at Lab. Due to high TSS, sample would not balance.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15146

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	10.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

HCC02
Temperature 11.0°C
Flow NA
Rec'd 1515 hr.
Sampled 1135 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	283
DO	6.7
Turbidity	26

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Analysis report no. 59-15439

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	160	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Total	145	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400 SW
Anions	3.5	----	meq/l	---------	---------- ----- --
Calcium, Total	46	1	mg/l	EPA 215.1	09-28-1995 1200 MK
Cations	3.5	----	meq/l	---------	---------- ----- --
Chloride	9	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	325	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	164	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200 MK
Iron, Total	0.6	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	12	1	mg/l	EPA 242.1	09-28-1995 1300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	6.3	----	mg/l	EPA 360.1	09-18-1995 1500 BR
pH	8.21	----	pH units	EPA 150.1	09-18-1995 1700 BR
Potassium, Total	<1	1	mg/l	EPA 258.1	09-28-1995 1000 MK
Sodium, Total	5	1	mg/l	EPA 273.1	09-28-1995 1030 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-18-1995 1545 MK
Solids, Total Dissolved	210	10	mg/l	EPA 160.1	10-10-1995 1030 JC
Solids, Total Suspended	30	5	mg/l	EPA 160.2	09-22-1995 1030 JC
Sulfate	15	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	16.0	0.1	NTU	EPA 180.1	09-18-1995 1545 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow Jr

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

HCC02
Temperature 11.0°C
Flow NA
Rec'd 1515 hr.
Sampled 1135 hr.

FIELD MEASUREMENTS

pH	8.62
Conductivity	283
DO	6.7
Turbidity	26

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Analysis report no. 59-15439

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-0.3	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 5.0°C
Flow NA
Rec'd 1600 hr.
Sampled 1432 hr.

FIELD MEASUREMENTS

pH	8.89
Conductivity	386
DO	7.8

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15715

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-15-1995 0630 SW
Alkalinity, Bicarbonate	250	5	mg/l as HCO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Total	210	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1030 SW
Anions	5.1	----	meq/l	---------	---------- ----- --
Calcium, Total	55	1	mg/l	EPA 215.1	12-15-1995 1530 MK
Cations	4.9	----	meq/l	---------	---------- ----- --
Chloride	11	1	mg/l	SM4500-Cl-B	12-27-1995 0700 SW
Conductivity	460	1	umhos/cm	SM2510-B	12-15-1995 1615 SW
Hardness, Total	228	10	mg/l as $CaCO_3$	SM2340-B	12-15-1995 1530 MK
Iron, Total	0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Magnesium, Total	22	1	mg/l	EPA 242.1	12-15-1995 1600 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-18-1995 1015 MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-28-1995 0800 JC
Oxygen, Dissolved	8.0	----	mg/l	EPA 360.1	12-14-1995 1730 BR
pH	8.49	----	pH units	EPA 150.1	12-14-1995 1700 BR
Potassium, Total	2	1	mg/l	EPA 258.1	12-18-1995 1045 MK
Sodium, Total	9	1	mg/l	EPA 273.1	12-18-1995 1100 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-15-1995 0700 MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	12-15-1995 0730 JC
Solids, Total Suspended	20	5	mg/l	EPA 160.2	12-15-1995 1200 JC
Sulfate	31	1	mg/l	EPA 375.4	12-28-1995 1200 SW
Turbidity	3.2	0.1	NTU	EPA 180.1	12-15-1995 0700 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
1 - 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC02
Temperature 5.0°C
Flow NA
Rec'd 1600 hr.
Sampled 1432 hr.

FIELD MEASUREMENTS

pH	8.89
Conductivity	386
DO	7.8

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15715

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-1.7	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

Huntington Canyon Creek HCC04

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 5.0°C
Flow NA
Rec'd 1630 hr.
Sampled 1545 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	480
DO	4.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14861

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	200	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	185	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	5.20	----	meq/l	---------	---------- ----- --
Calcium, Total	55	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	5.20	----	meq/l	---------	---------- ----- --
Chloride	18	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	501	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.1	0.1	mg/l	EPA 236.1	04-05-1995 1600 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	23	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	5.1	----	mg/l	EPA 360.1	03-29-1995 1335 ED
pH	8.42	----	pH units	EPA 150.1	03-29-1995 1630 ED
Potassium, Total	2	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	14	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-30-1995 0730 SW
Solids, Total Dissolved	220	10	mg/l	EPA 160.1	03-30-1995 0800 SW
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	03-31-1995 0800 SW
Sulfate	44	1	mg/l	EPA 375.4	04-06-1995 0900 SW
Turbidity	1.5	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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RECEIVED
4/12/95

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 5.0°C
Flow NA
Rec'd 1630 hr.
Sampled 1545 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	480
DO	4.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14861

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	0.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CO

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04

Kind of sample reported to us Water

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1135 hr.

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

NOTE: Dissolved metals filtered at Lab.

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15145

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
lkalinity, Bicarbonate	185	5	mg/l as HCO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Total	175	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1300 SW
Anions	4.00	----	meq/l	---------	---------- ----- --
Calcium, Total	65	1	mg/l	EPA 215.1	07-11-1995 1100 MK
Cations	4.70	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	311	1	umhos/cm	SM2510-B	07-12-1995 0740 MK
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	07-11-1995 1100 MK
Iron, Total	1.7	0.1	mg/l	EPA 236.1	07-11-1995 1140 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Magnesium, Total	16	1	mg/l	EPA 242.1	07-11-1995 1120 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-11-1995 1200 MK
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	7.3	----	mg/l	EPA 360.1	06-30-1995 1550 MK
pH	7.90	----	pH units	EPA 150.1	06-30-1995 1510 MK
Potassium, Total	<1	1	mg/l	EPA 258.1	07-11-1995 1235 MK
Sodium, Total	3	1	mg/l	EPA 273.1	07-11-1995 1245 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-30-1995 1400 MK
Solids, Total Dissolved	180	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	95	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	15	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	27.0	0.1	NTU	EPA 180.1	06-30-1995 1410 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES INC.

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TEL: (801) 653-2311
FAX: (801) 653-2436

July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04

Temperature 10.0°C
Rec'd 1320 hr.
Sampled 1135 hr.

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/CAS

Date sampled June 30, 1995

Date received June 30, 1995

Analysis report no. 59-15145

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	7.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

HCC04
Temperature 11.5°C
Flow NA
Rec'd 1515 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	8.59
Conductivity	305
DO	7.2
Turbidity	25

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Analysis report no. 59-15440

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	165	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Total	145	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400 SW
Anions	3.7	----	meq/l	---------	---------- ----- --
Calcium, Total	49	1	mg/l	EPA 215.1	09-28-1995 1200 MK
Cations	3.8	----	meq/l	---------	---------- ----- --
Chloride	10	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	346	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	176	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200 MK
Iron, Total	0.6	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	13	1	mg/l	EPA 242.1	09-28-1995 1300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-21-1995 0930 JC
Oxygen, Dissolved	7.3	----	mg/l	EPA 360.1	09-18-1995 1500 BR
pH	8.23	----	pH units	EPA 150.1	09-18-1995 1700 BR
Potassium, Total	1	1	mg/l	EPA 258.1	09-28-1995 1000 MK
Sodium, Total	7	1	mg/l	EPA 273.1	09-28-1995 1030 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-18-1995 1545 MK
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	10-10-1995 1030 JC
Solids, Total Suspended	30	5	mg/l	EPA 160.2	09-22-1995 1030 JC
Sulfate	18	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	16.0	0.1	NTU	EPA 180.1	09-18-1995 1545 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/059/95
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FAX: (801) 653-2436

October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

HCC04
Temperature 11.5°C
Flow NA
Rec'd 1515 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	8.59
Conductivity	305
DO	7.2
Turbidity	25

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Analysis report no. 59-15440

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.7	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JAN 9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 5.6°C
Flow NA
Rec'd 1600 hr.
Sampled 1441 hr.

FIELD MEASUREMENTS

pH	8.68
Conductivity	500
DO	8.5

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15716

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-15-1995 0630	SW
Alkalinity, Bicarbonate	250	5	mg/l as HCO_3	SM2320-B	12-26-1995 1030	SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1030	SW
Alkalinity, Total	210	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1030	SW
Anions	6.2	----	meq/l	---------	---------- -----	--
Calcium, Total	61	1	mg/l	EPA 215.1	12-15-1995 1530	MK
Cations	6.0	----	meq/l	---------	---------- -----	--
Chloride	21	1	mg/l	SM4500-Cl-B	12-27-1995 0700	SW
Conductivity	569	1	umhos/cm	SM2510-B	12-15-1995 1615	SW
Hardness, Total	264	10	mg/l as $CaCO_3$	SM2340-B	12-15-1995 1530	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815	MK
Magnesium, Total	27	1	mg/l	EPA 242.1	12-15-1995 1600	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-18-1995 1015	MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-28-1995 0800	JC
Oxygen, Dissolved	7.6	----	mg/l	EPA 360.1	12-14-1995 1730	BR
pH	8.50	----	pH units	EPA 150.1	12-14-1995 1700	BR
Potassium, Total	1	1	mg/l	EPA 258.1	12-18-1995 1045	MK
Sodium, Total	17	1	mg/l	EPA 273.1	12-18-1995 1100	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-15-1995 0700	MK
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	12-15-1995 0730	JC
Solids, Total Suspended	10	5	mg/l	EPA 160.2	12-15-1995 1200	JC
Sulfate	71	1	mg/l	EPA 375.4	12-28-1995 1200	SW
Turbidity	1.9	0.1	NTU	EPA 180.1	12-15-1995 0700	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Huntington Canyon Creek HCC04
Temperature 5.6°C
Flow NA
Rec'd 1600 hr.
Sampled 1441 hr.

FIELD MEASUREMENTS

pH	8.68
Conductivity	500
DO	8.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Huntington Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15716

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-1.9	----	%		

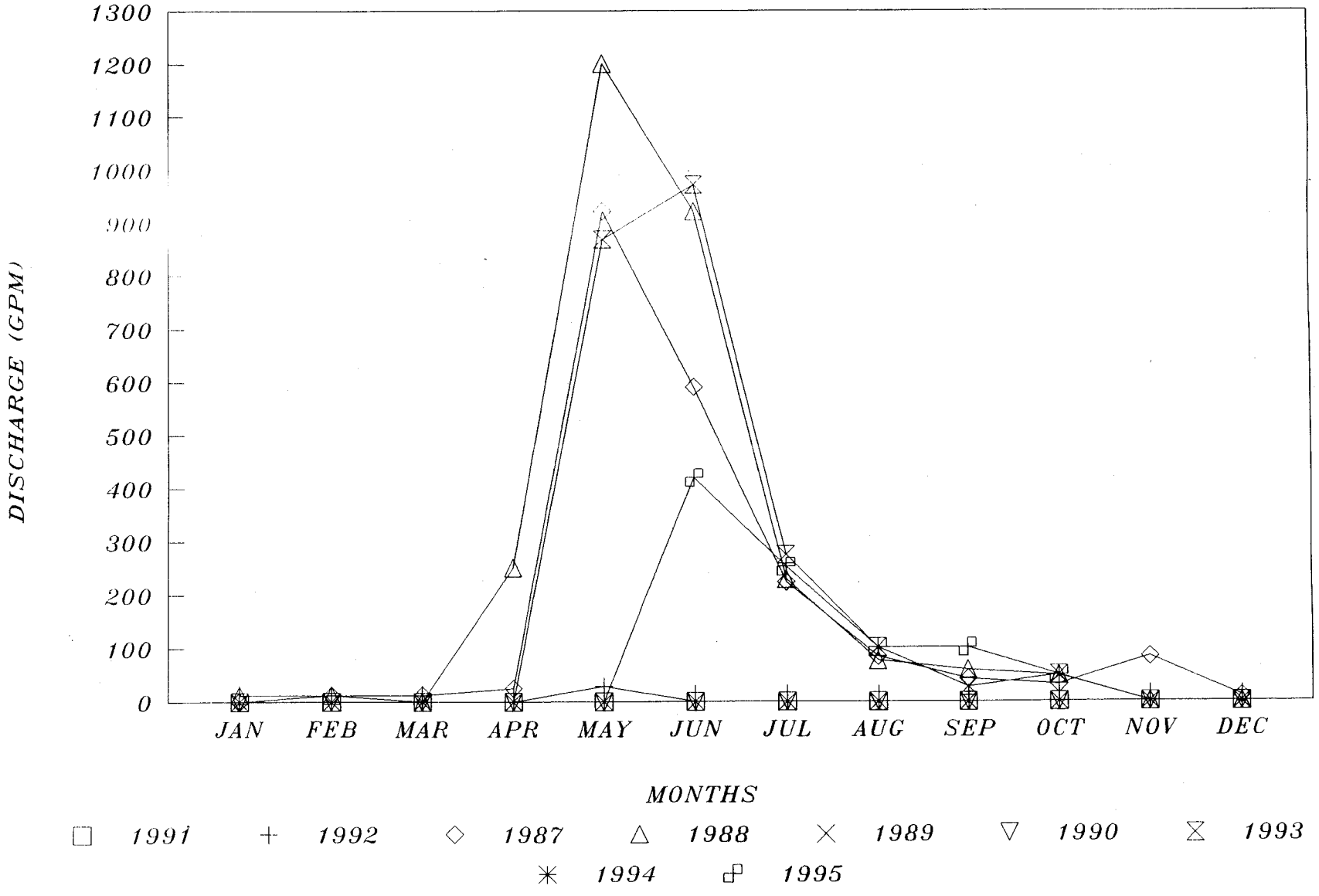
Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

APPENDIX B

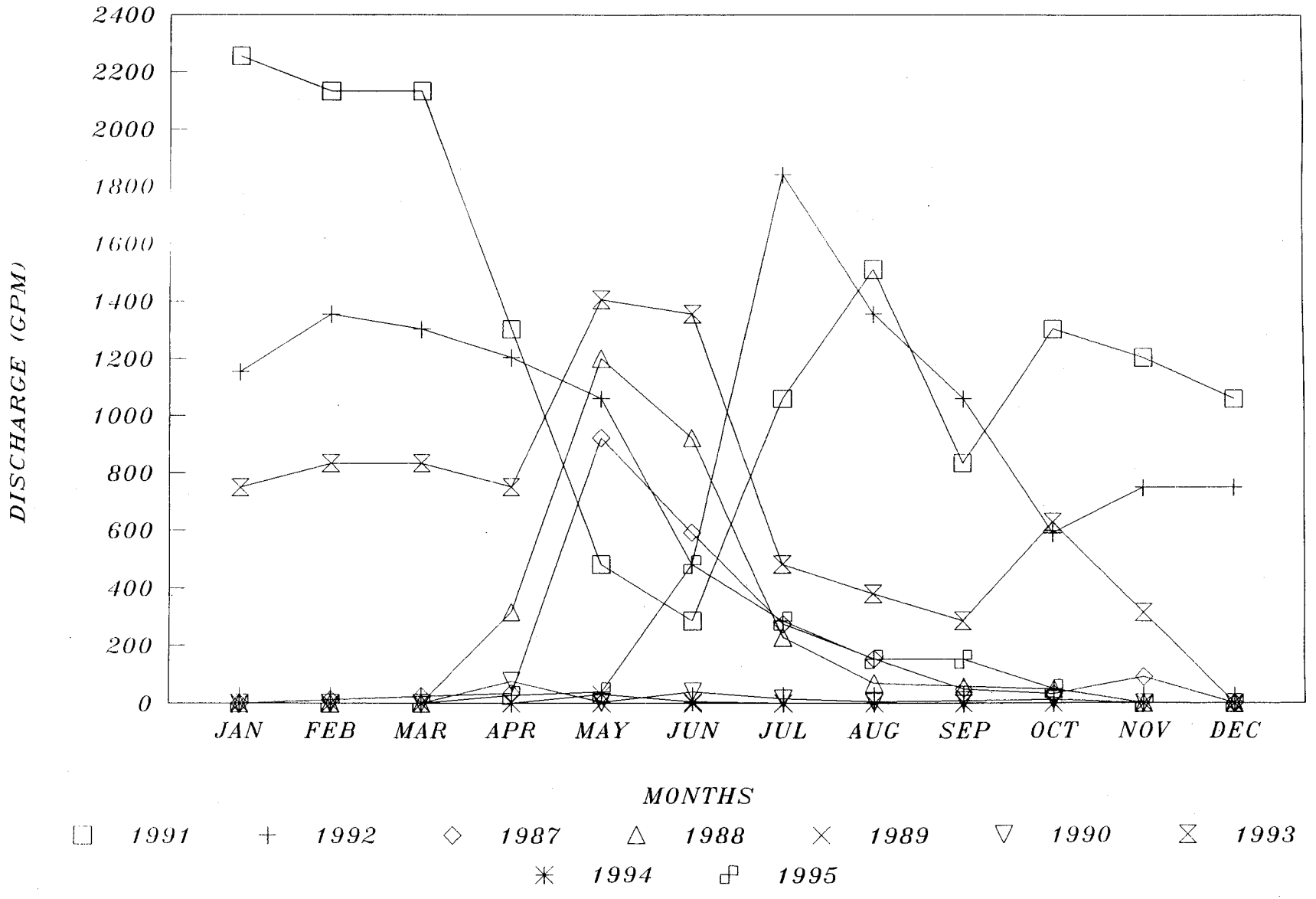
DEER CREEK – ABOVE MINE

Drainage Recession Curve Study



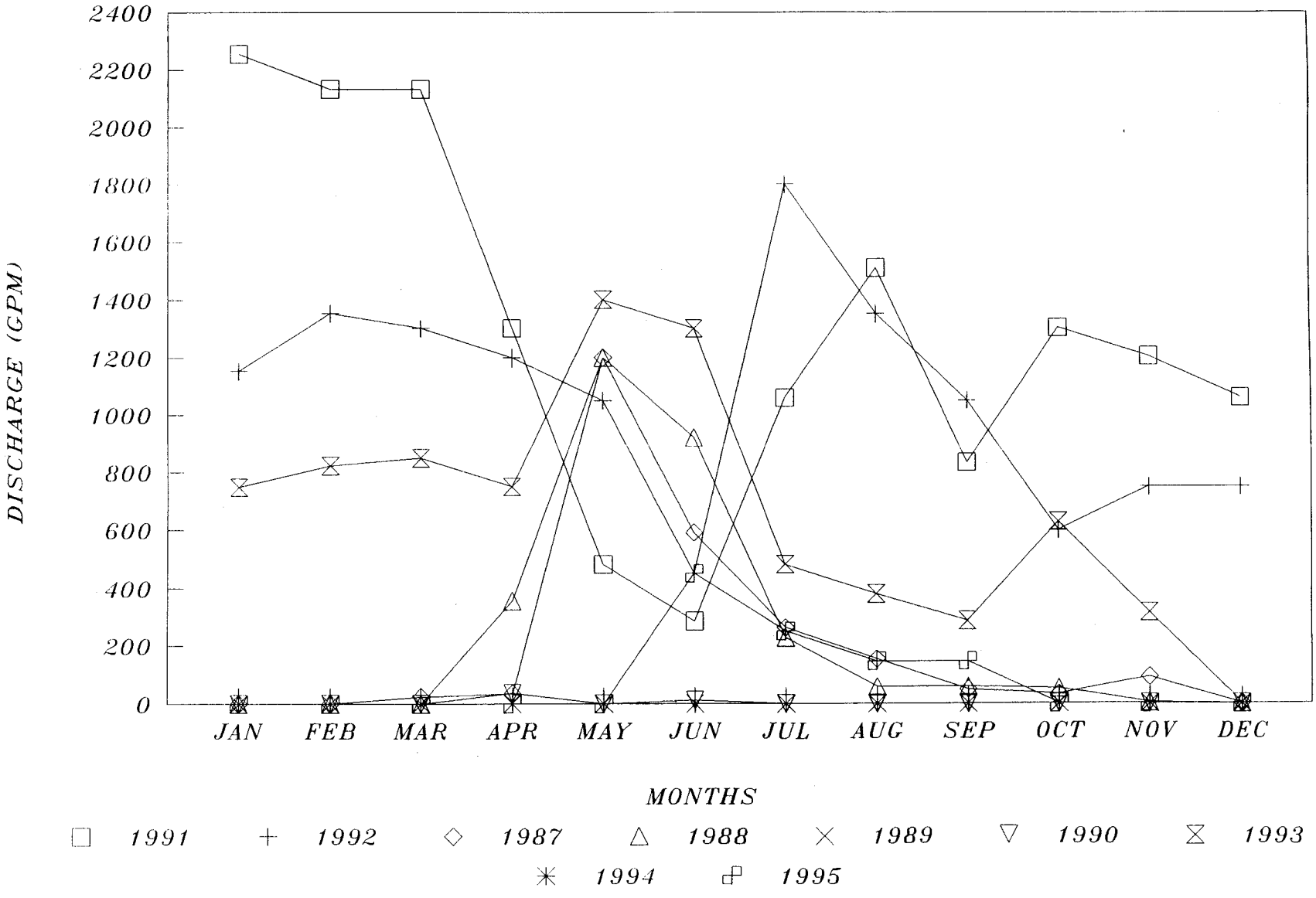
DEER CREEK – @ PERMIT BOUNDARY

Drainage Recession Curve Study



DEER CREEK – BELOW MINE

Drainage Recession Curve Study



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FAX: (801) 653-2436

July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 1 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

DCR01
Temperature 12.0°C
Flow 0.25/ 419 GPM
Rec'd 1615 hr.
Sampled NA

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15132

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800	SW
Alkalinity, Bicarbonate	280	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730	SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 0730	SW
Alkalinity, Total	255	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730	SW
Anions	5.80	----	meq/l	---------	---------- -----	--
Calcium, Total	56	1	mg/l	EPA 215.1	07-05-1995 1350	MK
Cations	6.00	----	meq/l	---------	---------- -----	--
Chloride	6	1	mg/l	SM4500-Cl-B	07-07-1995 0730	SW
Conductivity	503	1	umhos/cm	SM2510-B	06-29-1995 1510	MK
Hardness, Total	240	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350	MK
Iron, Total	0.1	0.1	mg/l	EPA 236.1	07-05-1995 1010	ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220	MK
Magnesium, Total	25	1	mg/l	EPA 242.1	07-05-1995 1440	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100	ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-12-1995 0740	JK
Oxygen, Dissolved	4.9	----	mg/l	EPA 360.1	06-29-1995 0700	MK
pH	7.44	----	pH units	EPA 150.1	06-29-1995 0630	SW
Potassium, Total	<1	1	mg/l	EPA 258.1	07-05-1995 1140	ED
Sodium, Total	27	1	mg/l	EPA 273.1	07-05-1995 1525	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845	MK
Solids, Total Dissolved	250	10	mg/l	EPA 160.1	06-29-1995 1030	JC
Solids, Total Suspended	25	5	mg/l	EPA 160.2	06-30-1995 0930	JC
Sulfate	26	1	mg/l	EPA 375.4	07-11-1995 0730	SW
Turbidity	12.0	0.1	NTU	EPA 180.1	06-29-1995 1200	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

DCR01
Temperature 12.0°C
Flow GPM
Rec'd 1615 hr.
Sampled NA

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15132

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

DCR01
Temperature 9.0°C
Flow 101.27 GPM
Rec'd 1515 hr.
Sampled 1016 hr.

FIELD MEASUREMENTS

pH	8.81
Conductivity	530
DO	7.9
Turbidity	2.5

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95, unacceptable, rerun on 10/10/95.

Analysis report no. 59-15442

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-25-1995 0800 SW
lkalinity, Bicarbonate	280	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Total	255	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400 SW
Anions	6.4	----	meq/l	---------	---------- ----- --
Calcium, Total	50	1	mg/l	EPA 215.1	09-28-1995 1200 MK
Cations	7.2	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	597	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	269	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Magnesium, Total	35	1	mg/l	EPA 242.1	09-28-1995 1300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915 MK
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1995 0930 JC
Oxygen, Dissolved	6.6	----	mg/l	EPA 360.1	09-18-1995 1500 BR
pH	8.35	----	pH units	EPA 150.1	09-18-1995 1700 BR
Potassium, Total	1	1	mg/l	EPA 258.1	09-28-1995 1000 MK
Sodium, Total	43	1	mg/l	EPA 273.1	10-17-1995 1245 MK
Solids, Total Dissolved	360	10	mg/l	EPA 160.1	10-10-1995 1030 JC
Solids, Total Suspended	5	5	mg/l	EPA 160.2	09-22-1995 1030 JC
Sulfate	52	1	mg/l	EPA 375.4	10-06-1995 1130 BR
Turbidity	2.1	0.1	NTU	EPA 180.1	09-18-1995 1545 MK
Cation/Anion Balance	6.2	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

DCR04
Temperature 12.0°C
Flow 0.21 /480
Rec'd 1615 hr.
Sampled 1515 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15128

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800
Alkalinity, Bicarbonate	270	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	250	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	6.60	----	meq/l	---------	---------- ----- --
Calcium, Total	54	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	6.90	----	meq/l	---------	---------- ----- --
Chloride	24	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	595	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	250	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	0.2	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Magnesium, Total	28	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-10-1995 1220 JK
Oxygen, Dissolved	5.2	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	7.96	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	<1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	35	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Total Dissolved	330	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	20	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	39	1	mg/l	EPA 375.4	07-10-1995 0730 SW
Turbidity	10.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK
Cation/Anion Balance	-0.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

DCR04
Temperature 10.7°C
Flow 151.91 GPM
Rec'd 1515 hr.
Sampled 1055 hr.

FIELD MEASUREMENTS

pH	8.74
Conductivity	907
DO	7.8
Turbidity	12

NOTE: Dissolved metals filtered at Lab. TDS run on 9/21/95 was unacceptable, rerun on 10/10/95.

Analysis report no. 59-15444

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-25-1995 0800	SW
Alkalinity, Bicarbonate	265	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400	SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	09-25-1995 1400	SW
Alkalinity, Total	240	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400	SW
Anions	10.0	----	meq/l	---------	---------- -----	--
Calcium, Total	56	1	mg/l	EPA 215.1	09-28-1995 1200	MK
Cations	10.8	----	meq/l	---------	---------- -----	--
Chloride	125	1	mg/l	SM4500-Cl-B	09-28-1995 1400	SW
Conductivity	1045	1	umhos/cm	SM2510-B	10-02-1995 1230	SW
Hardness, Total	300	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745	MK
Magnesium, Total	39	1	mg/l	EPA 242.1	09-28-1995 1300	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915	MK
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1995 0930	JC
Oxygen, Dissolved	6.9	----	mg/l	EPA 360.1	09-18-1995 1500	BR
pH	8.41	----	pH units	EPA 150.1	09-18-1995 1700	BR
Potassium, Total	2	1	mg/l	EPA 258.1	09-28-1995 1000	MK
Sodium, Total	111	1	mg/l	EPA 273.1	09-28-1995 1030	MK
Solids, Total Dissolved	600	10	mg/l	EPA 160.1	10-10-1995 1030	JC
Solids, Total Suspended	10	5	mg/l	EPA 160.2	09-22-1995 1030	JC
Sulfate	76	1	mg/l	EPA 375.4	10-02-1995 0800	SW
Turbidity	5.5	0.1	NTU	EPA 180.1	09-18-1995 1545	MK
Cation/Anion Balance	4.2	----	%			

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

DCR06
Temperature 15.0°C
Flow EST @ 450 GPM
Rec'd 1615 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15130

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800	
Alkalinity, Bicarbonate	250	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730	
Alkalinity, Carbonate	25	5	mg/l as CO_3	SM2320-B	07-06-1995 0730	SW
Alkalinity, Total	240	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730	SW
Anions	9.50	----	meq/l	---------	---------- -----	--
Calcium, Total	66	1	mg/l	EPA 215.1	07-05-1995 1350	MK
Cations	10.10	----	meq/l	---------	---------- -----	--
Chloride	111	1	mg/l	SM4500-Cl-B	07-07-1995 0730	SW
Conductivity	936	1	umhos/cm	SM2510-B	06-29-1995 1510	MK
Hardness, Total	330	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350	MK
Iron, Total	0.3	0.1	mg/l	EPA 236.1	07-05-1995 1010	ED
Iron, Dissolved	0.2	0.1	mg/l	EPA 236.1	07-04-1995 0930	ED
Magnesium, Total	41	1	mg/l	EPA 242.1	07-05-1995 1440	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100	ED
Oil & Grease	5	5	mg/l	EPA 413.1	07-10-1995 1220	JK
Oxygen, Dissolved	4.0	----	mg/l	EPA 360.1	06-29-1995 0700	MK
pH	8.12	----	pH units	EPA 150.1	06-29-1995 0630	SW
Potassium, Total	2	1	mg/l	EPA 258.1	07-05-1995 1140	ED
Sodium, Total	79	1	mg/l	EPA 273.1	07-05-1995 1525	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845	MK
Solids, Total Dissolved	490	10	mg/l	EPA 160.1	06-29-1995 1030	JC
Solids, Total Suspended	30	5	mg/l	EPA 160.2	06-30-1995 0930	JC
Sulfate	70	1	mg/l	EPA 375.4	07-11-1995 0730	SW
Turbidity	12.0	0.1	NTU	EPA 180.1	06-29-1995 1200	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Mont

Manager, Huntington Laboratory

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July 14, 1995

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P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

DCR06
Temperature 15.0°C
Flow EST @ 450 GPM
Rec'd 1615 hr.
Sampled 1530 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15130

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	3.00	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 9, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

DCR06
Temperature 15.1°C
Flow 145 GPM
Rec'd 1515 hr.
Sampled 1112 hr.

FIELD MEASUREMENTS

pH	8.74
Conductivity	1270
DO	7.2
Turbidity	6

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Deer Creek

Sample taken by Energy West/KRH

Date sampled September 18, 1995

Date received September 18, 1995

Analysis report no. 59-15445

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	09-25-1995 0800	SW
Alkalinity, Bicarbonate	255	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400	
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	09-25-1995 1400	SW
Alkalinity, Total	240	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400	SW
Anions	15.2	----	meq/l	---------	---------- -----	--
Calcium, Total	66	1	mg/l	EPA 215.1	09-28-1995 1200	MK
Cations	16.6	----	meq/l	---------	---------- -----	--
Chloride	279	1	mg/l	SM4500-Cl-B	09-28-1995 1400	SW
Conductivity	1537	1	umhos/cm	SM2510-B	10-02-1995 1230	SW
Hardness, Total	400	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-05-1995 1315	MK
Magnesium, Total	57	1	mg/l	EPA 242.1	09-28-1995 1300	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915	MK
Oil & Grease	<5	5	mg/l	EPA 413.1	09-21-1995 0930	JC
Oxygen, Dissolved	6.4	----	mg/l	EPA 360.1	09-18-1995 1500	BR
pH	8.43	----	pH units	EPA 150.1	09-18-1995 1700	BR
Potassium, Total	3	1	mg/l	EPA 258.1	09-28-1995 1000	MK
Sodium, Total	199	1	mg/l	EPA 273.1	09-28-1995 1030	MK
Solids, Total Dissolved	900	10	mg/l	EPA 160.1	09-21-1995 0730	JC
Solids, Total Suspended	5	5	mg/l	EPA 160.2	09-22-1995 1030	JC
Sulfate	120	1	mg/l	EPA 375.4	10-02-1995 0800	SW
Turbidity	3.2	0.1	NTU	EPA 180.1	09-18-1995 1545	MK
Cation/Anion Balance	4.5	----	%			

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Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

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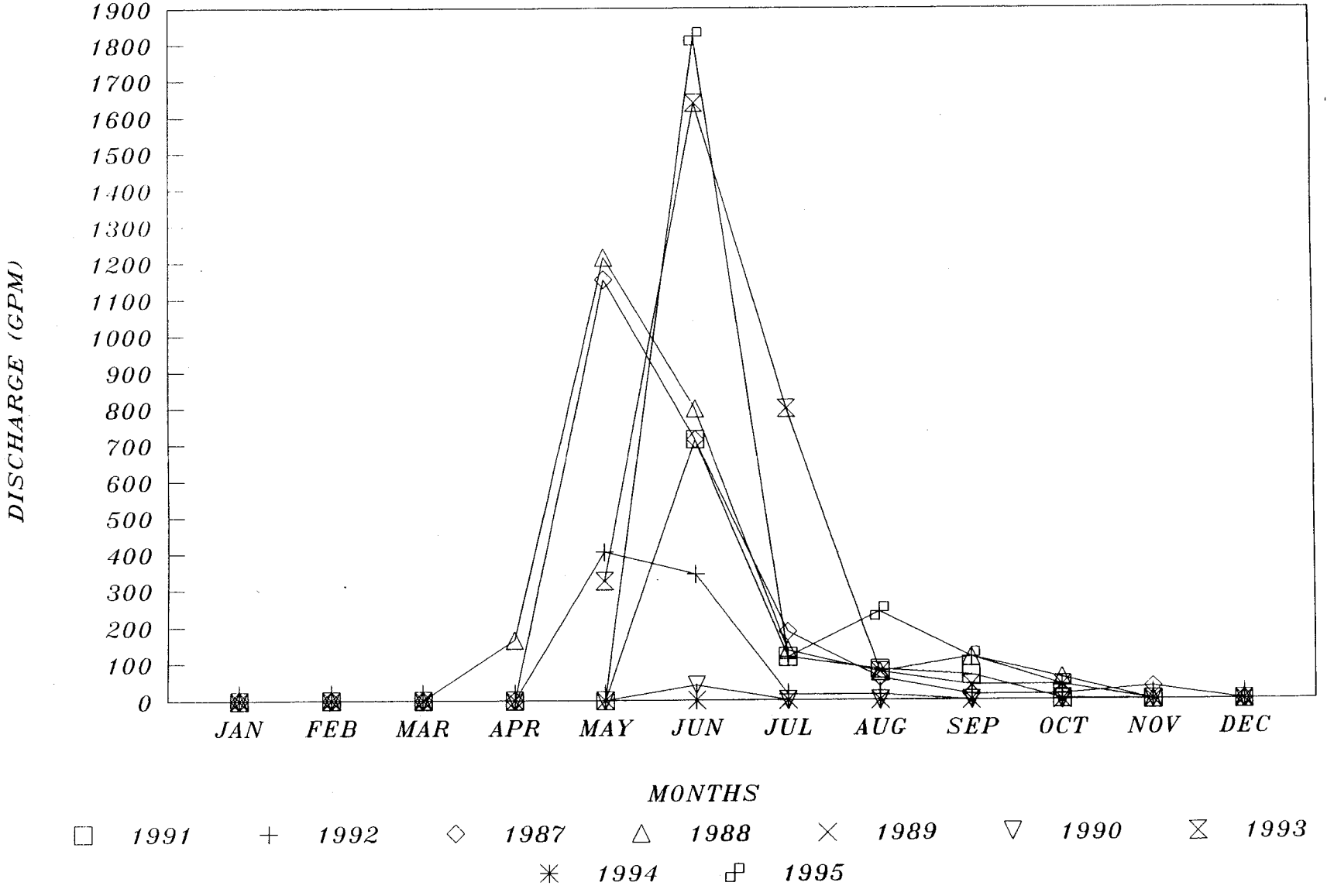
APPENDIX C

MEETINGHOUSE CANYON – LEFT FORK

Drainage Recession Curve Study



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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Meetinghouse Canyon MCH01
Temperature 10.0°C
Flow 1.21 1821 GPM
Rec'd 1615 hr.
Sampled 1430 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Meetinghouse Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15131

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
Alkalinity, Bicarbonate	230	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	210	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	4.70	----	meq/l	---------	---------- ----- --
Calcium, Total	53	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	4.80	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	399	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	220	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	0.1	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-06-1995 1220 MK
Magnesium, Total	21	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-10-1995 1220 JK
Oxygen, Dissolved	4.6	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	8.55	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	<1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	9	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845 MK
Solids, Total Dissolved	190	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	15	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	14	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	9.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 1 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Meetinghouse Canyon MCH01
Temperature 10.0°C
Flow 1.21 /1821
Rec'd 1615 hr.
Sampled 1430 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DC	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Meetinghouse Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15131

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.00	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

November 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
NOV 15 199
FIELD OFF

Sample identification by
PACIFICORP FIELD OFFICE

Meeting House Canyon MHC01
Temperature 5.3°C
Flow 41 GPM
Rec'd 1115 hr.
Sampled 0928 hr.

FIELD MEASUREMENTS

pH	8.75
Conductivity	402
DO	8.5

NOTE: Dissolved metals filtered at Lab.
Sample taken 9/18/95 would not balance.
Resampled 10/31/95 and reanalyzed.

Kind of sample reported to us Water

Sample taken at Meeting House Canyon

Sample taken by Energy West/KH

Date sampled October 31, 1995

Date received October 31, 1995

Analysis report no. 59-15612

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	40	10	mg/l as $CaCO_3$	D1067-92	11-08-1995 1430	SW
Alkalinity, Bicarbonate	240	5	mg/l as HCO_3	SM2320-B	11-08-1995 1300	SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	11-08-1995 1300	SW
Alkalinity, Total	215	5	mg/l as $CaCO_3$	EPA 310.1	11-08-1995 1300	SW
Anions	5.0	----	meq/l	---------	---------- -----	--
Calcium, Total	46	1	mg/l	EPA 215.1	11-03-1995 1400	MK
Cations	5.1	----	meq/l	---------	---------- -----	--
Chloride	5	1	mg/l	SM4500-Cl-B	10-31-1995 1030	SW
Conductivity	460	1	umhos/cm	SM2510-B	11-06-1995 1330	MK
Hardness, Total	234	10	mg/l as $CaCO_3$	SM2340-B	11-03-1995 1400	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	11-03-1995 1045	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	11-03-1995 1045	MK
Magnesium, Total	29	1	mg/l	EPA 242.1	11-03-1995 1430	MK
Manganese, Total	0.1	0.1	mg/l	EPA 243.1	11-03-1995 1200	MK
Oil & Grease	<5	5	mg/l	SM5520-B	11-02-1995 1000	JC
Oxygen, Dissolved	5.9	----	mg/l	EPA 360.1	10-31-1995 1500	BR
pH	8.36	----	pH units	EPA 150.1	10-27-1995 1600	BR
Potassium, Total	<1	1	mg/l	EPA 258.1	11-03-1995 1230	MK
Sodium, Total	9	1	mg/l	EPA 273.1	11-03-1995 1300	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	10-31-1995 1145	MK
Solids, Total Dissolved	200	10	mg/l	EPA 160.1	11-02-1995 0730	JC
Solids, Total Suspended	10	5	mg/l	EPA 160.2	11-03-1995 0800	JC
Sulfate	28	1	mg/l	EPA 375.4	11-13-1995 0800	SW
Turbidity	8.0	0.1	NTU	EPA 180.1	10-31-1995 1600	BR

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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November 14, 1995

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P.O. Box 1005
Huntington UT 84528

PACIFICORP
NOV 15 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Meeting House Canyon

Sample taken by Energy West/KH

Date sampled October 31, 1995

Date received October 31, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Meeting House Canyon MHC01
Temperature 5.3°C
Flow 41 GPM
Rec'd 1115 hr.
Sampled 0928 hr.

FIELD MEASUREMENTS

pH	8.75
Conductivity	402
DO	8.5

NOTE: Dissolved metals filtered at Lab. Sample taken 9/18/95 would not balance. Resampled 10/31/95 and reanalyzed.

Analysis report no. 59-15612

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	0.8	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

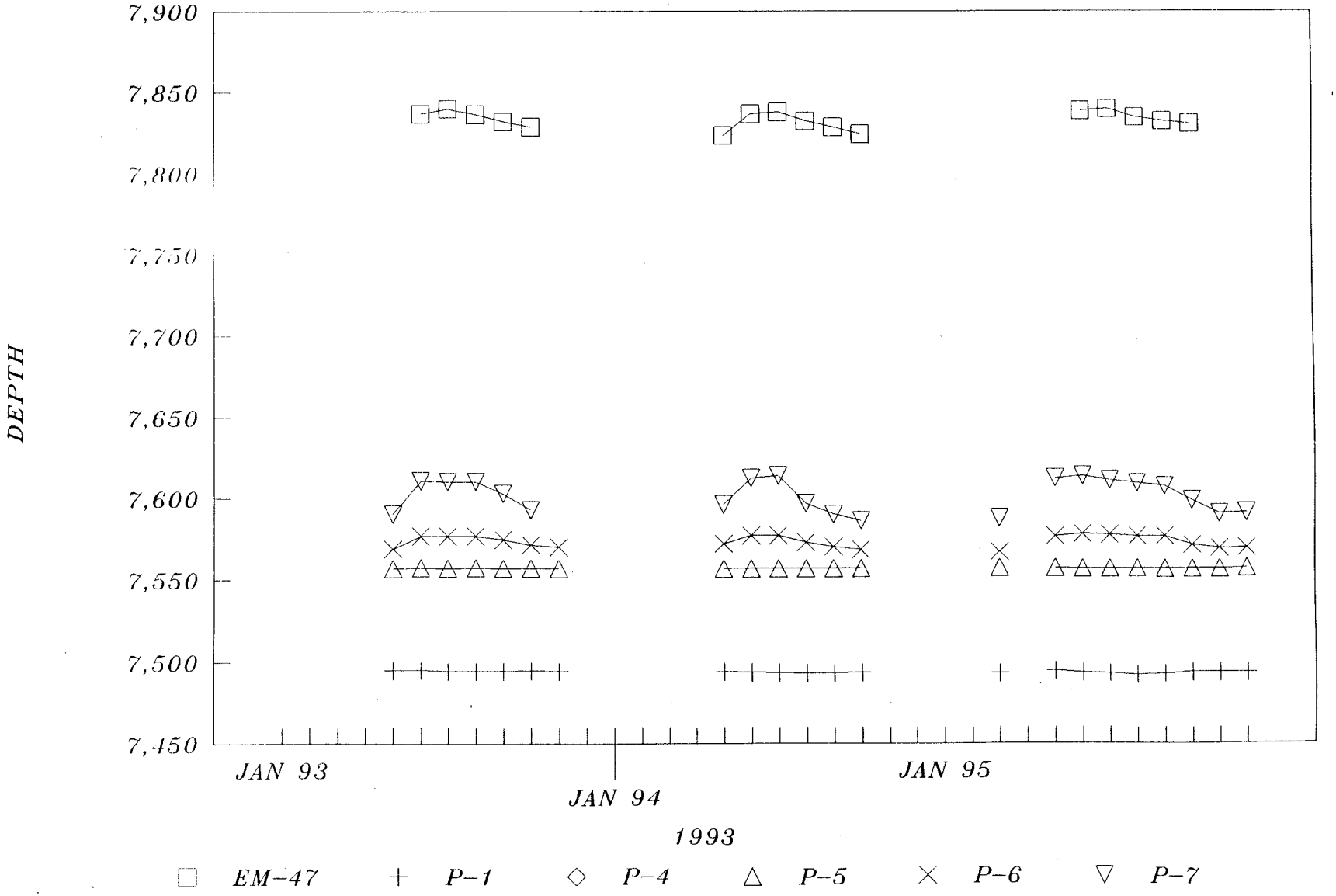
Larry Stow R

Manager, Huntington Laboratory

APPENDIX D

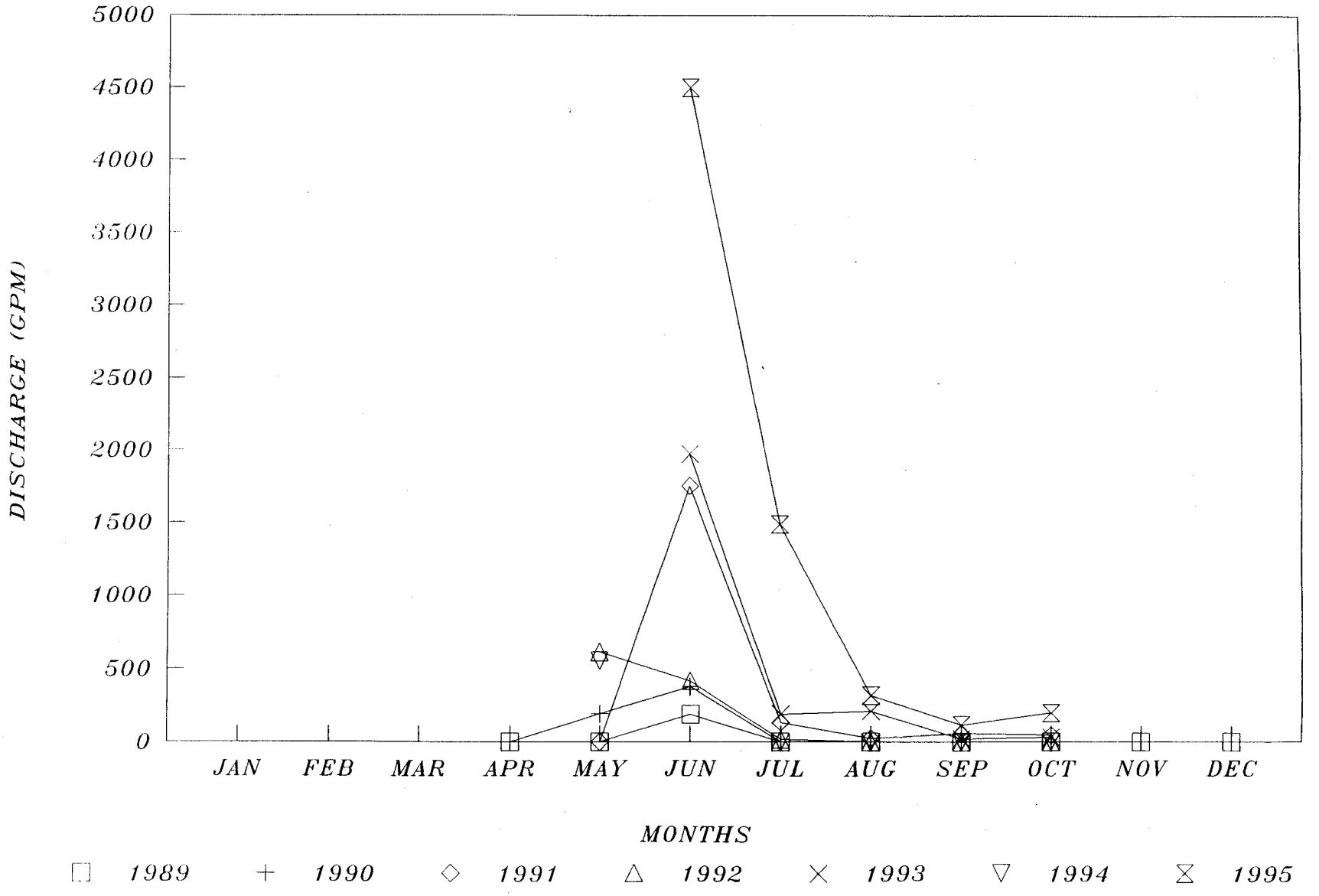
RILDA CANYON MONITORING WELLS

Piezometric Study



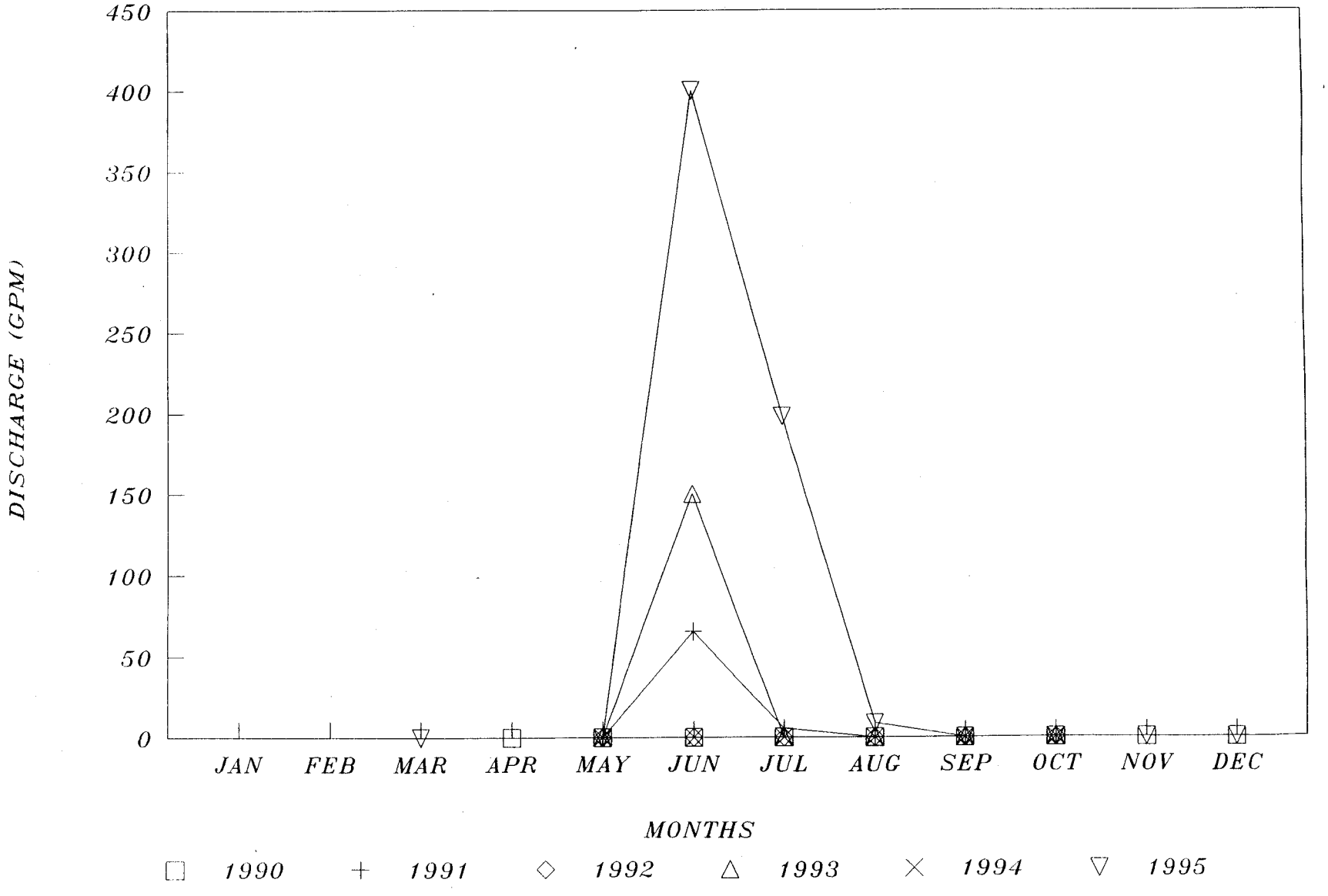
RILDA CANYON – RIGHT FORK(RCF1)

Drainage Recession Curve Study



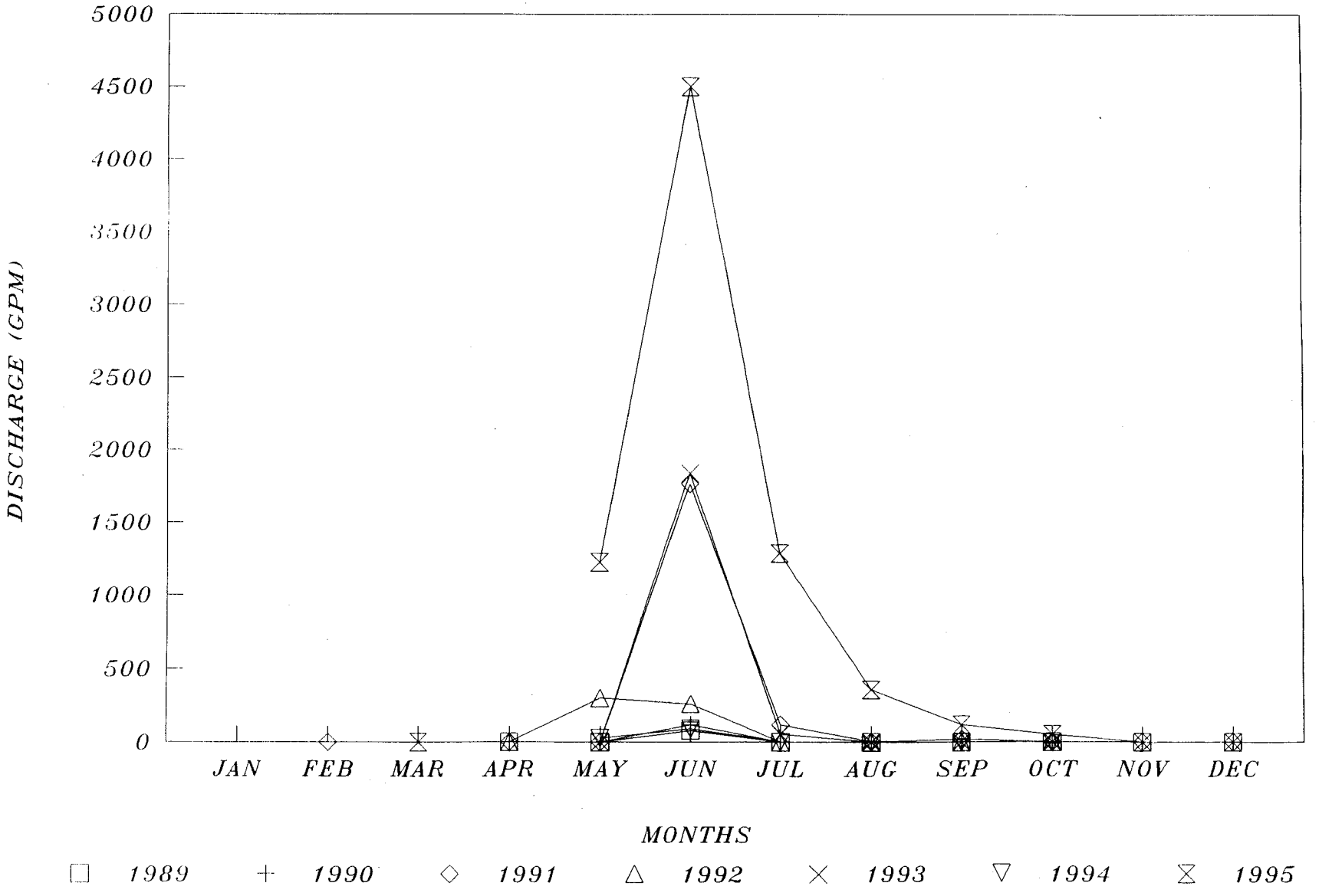
RILDA CANYON – LEFT FORK(RCLF1)

Drainage Recession Curve Study



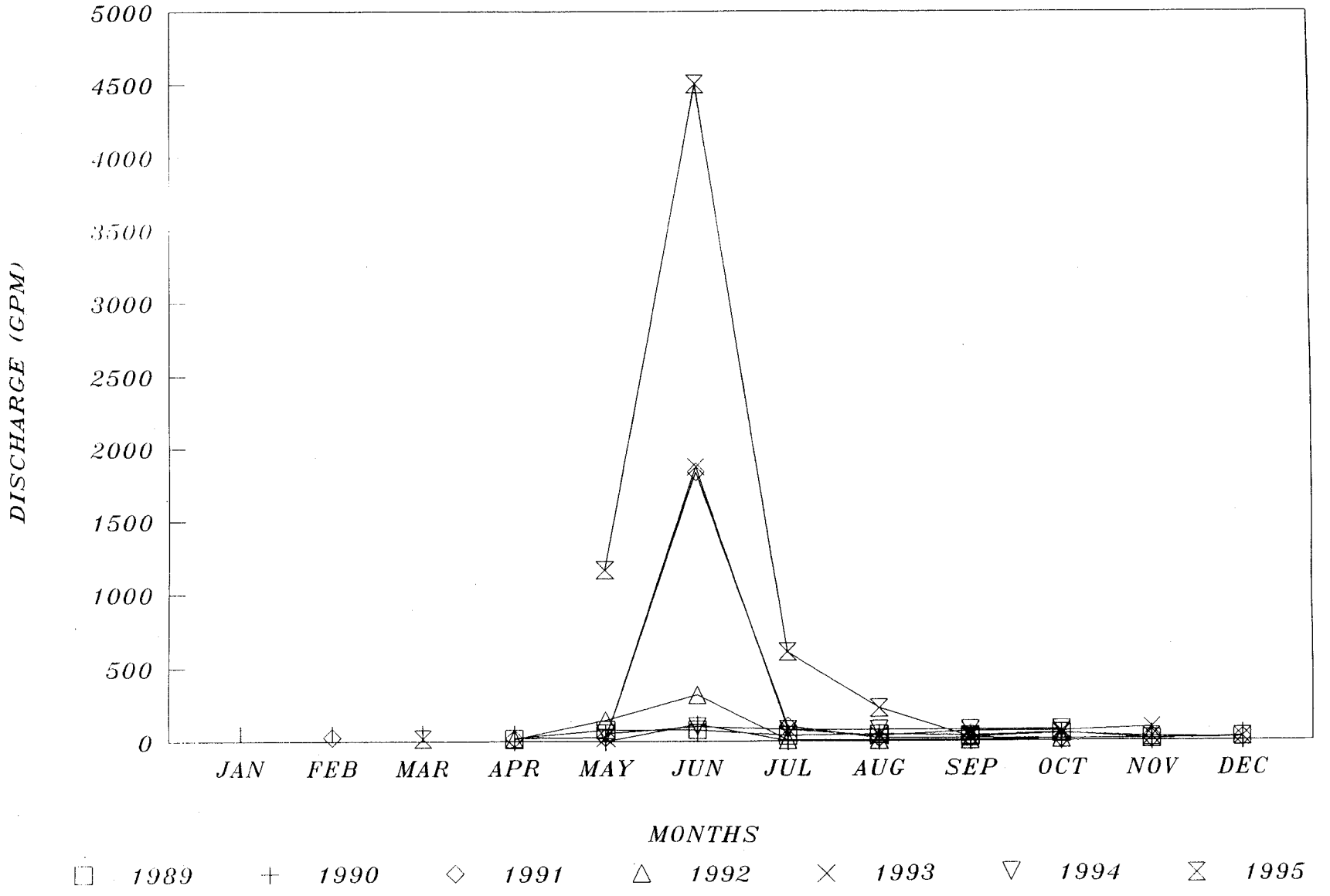
RILDA CANYON – ABOVE NEWUA(RCF2)

Drainage Recession Curve Study



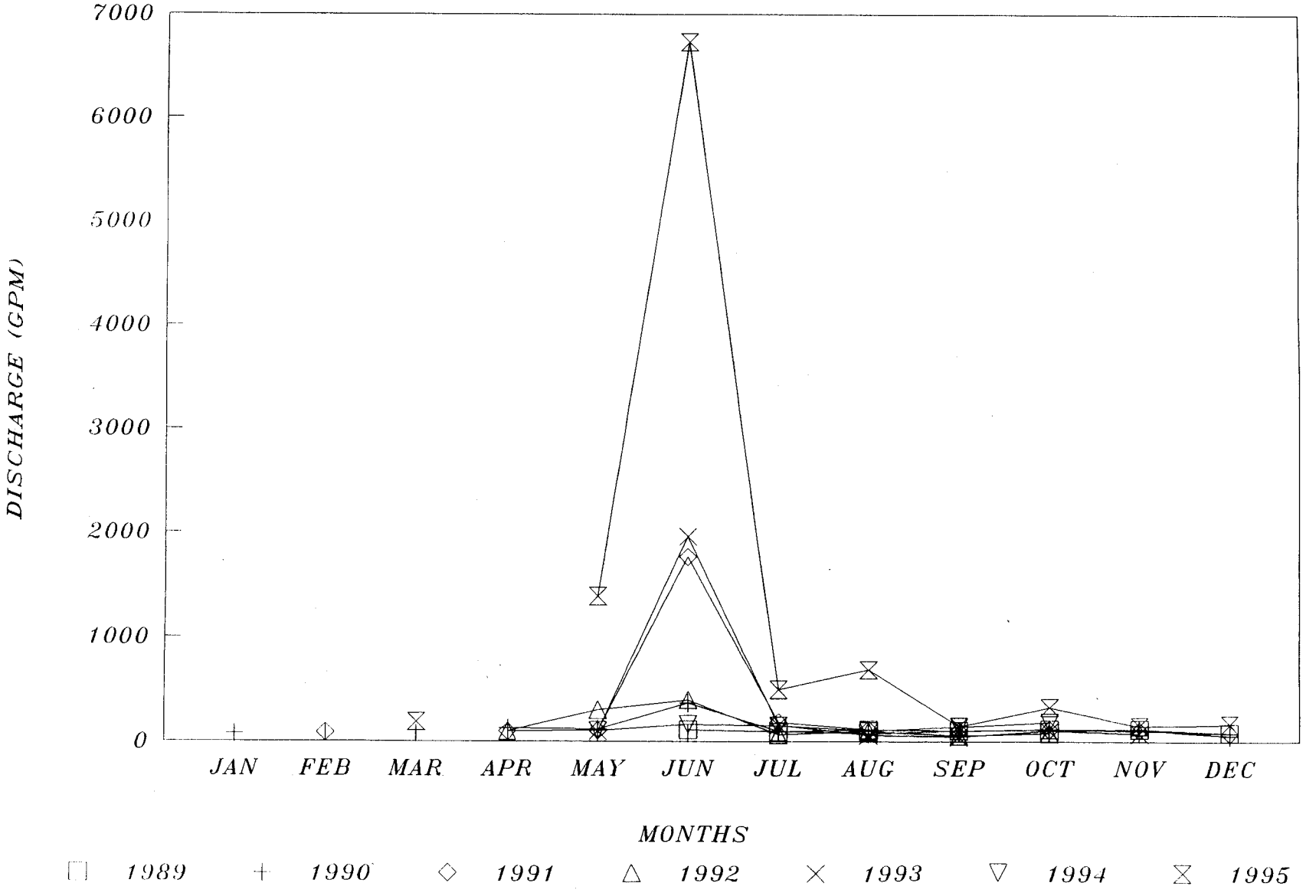
RILDA CANYON – BELOW NEWUA(RCF3)

Drainage Recession Curve Study



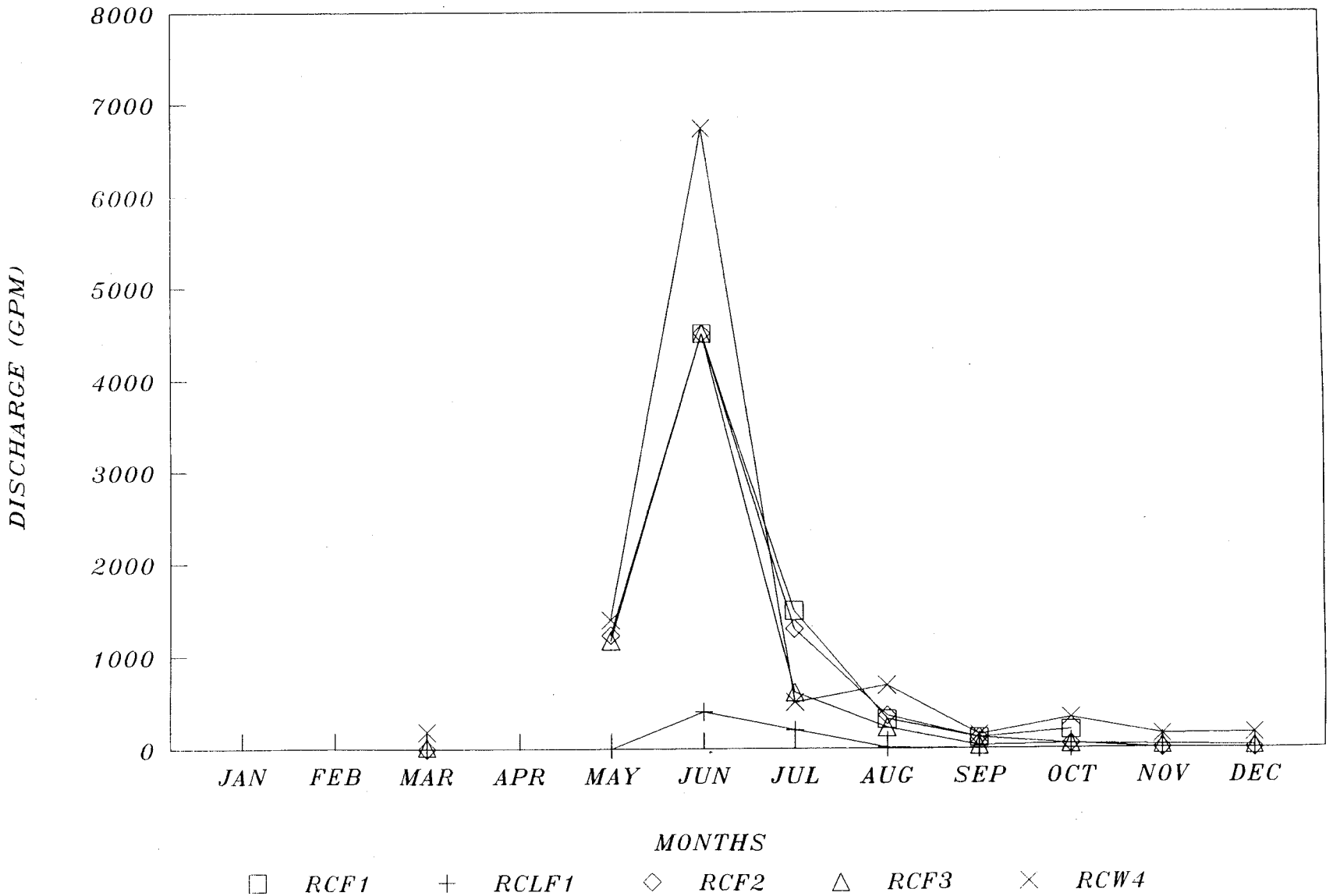
RILDA CANYON – NEAR HWY 31(RCW4)

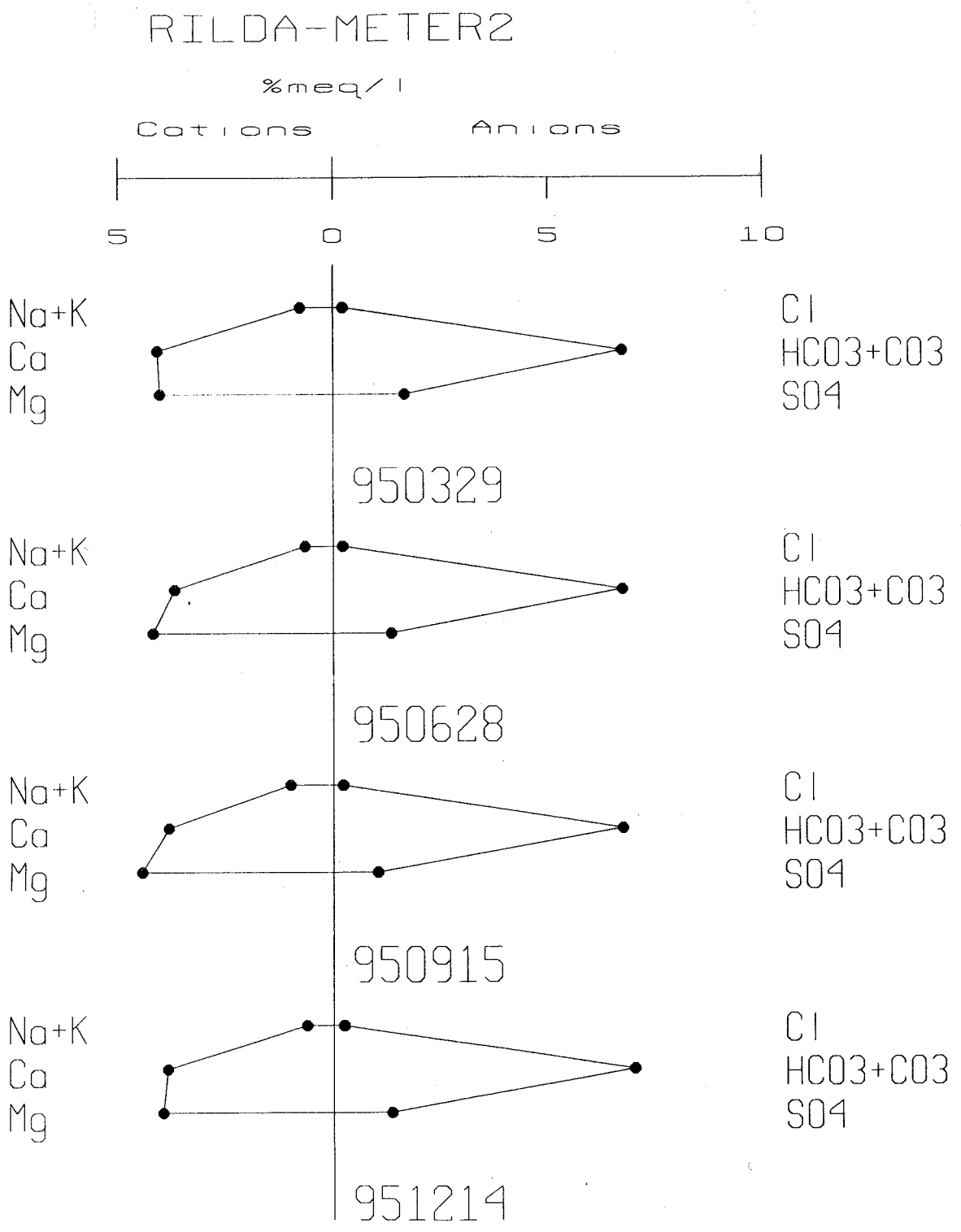
Drainage Recession Curve Study

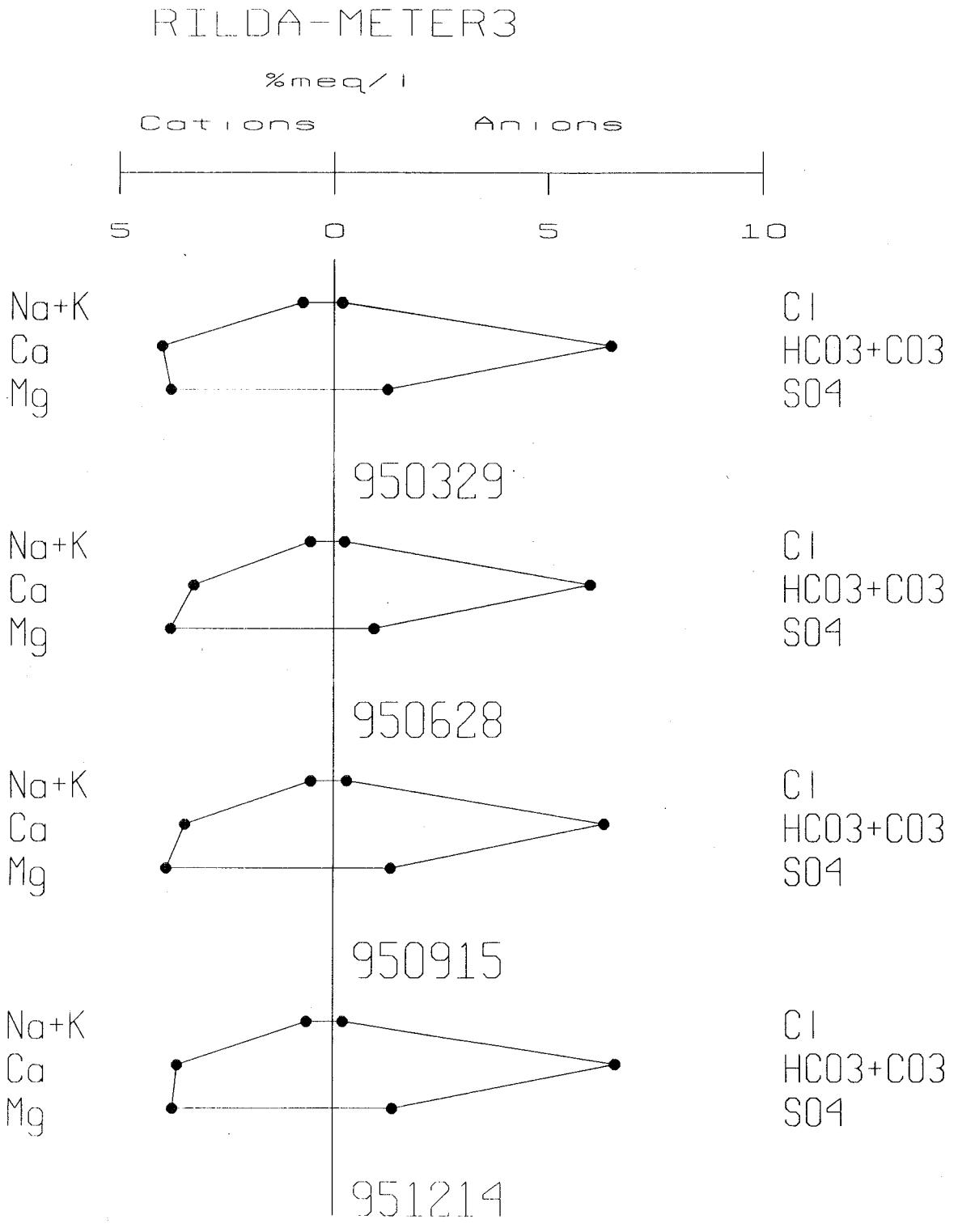


RILDA CANYON – 1995

Drainage Recession Curve Study




RILDA-METER2
%meq/l
Cations
Anions
5
0
5
10
Na+K
Ca
Mg
Cl
HCO3+CO3
SO4
950329
950628
950915
951214


RILDA-METER3
%meq/l
Cations
Anions
5
0
5
10
Na+K
Ca
Mg
Cl
HCO3+CO3
SO4
950329
Na+K
Ca
Mg
Cl
HCO3+CO3
SO4
950628
Na+K
Ca
Mg
Cl
HCO3+CO3
SO4
950915
Na+K
Ca
Mg
Cl
HCO3+CO3
SO4
951214

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TEL: (801) 653-2311
FAX: (801) 653-2436

July 17, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCF-1
Temperature 6.5°C
Flow ~~NA~~ EST @ 10 CFS / 4,500 GPM
Rec'd 1615 hr.
Sampled 0955 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Analysis report no. 59-15127

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
Alkalinity, Bicarbonate	260	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	240	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	5.40	----	meq/l	---------	---------- ----- --
Calcium, Total	83	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	6.10	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	423	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	290	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	2.5	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	1.2	0.1	mg/l	EPA 236.1	07-04-1995 0930 ED
Magnesium, Total	21	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oxygen, Dissolved	4.8	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	7.78	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	<1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	6	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845 MK
Solids, Total Dissolved	220	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	240	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	15	1	mg/l	EPA 375.4	07-10-1995 0730 SW
Turbidity	70.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK
Cation/Anion Balance	6.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF-1

Kind of sample reported to us Water

Rec'd 1025 hr.
Sampled 0800 - 1000 hr.

Sample taken at Rilda Canyon

NOTE: Sample temperature above 6.0°C when received.

Sample taken by Energy West/DON

Date sampled July 5, 1995

Date received July 5, 1995

Analysis report no. 59-15148

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	5	5	mg/l	EPA 413.1	07-14-1995 0755 JV

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF-1
Temperature 11.1°C
Flow 116 GPM
Rec'd 1530 hr.
Sampled 1151 hr.

FIELD MEASUREMENTS

pH	8.70
Conductivity	384
DO	6.9

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Analysis report no. 59-15433

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	245	5	mg/l as HCO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Total	215	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1300 SW
Anions	5.5	----	meq/l	---------	---------- ----- --
Calcium, Total	60	1	mg/l	EPA 215.1	09-20-1995 0745 MK
Cations	6.5	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	09-28-1995 1030 SW
Conductivity	439	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	270	10	mg/l as $CaCO_3$	SM2340-B	09-20-1995 0745 MK
Iron, Total	1.5	0.1	mg/l	EPA 236.1	09-19-1995 0600 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	30	1	mg/l	EPA 242.1	09-20-1995 1100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-19-1995 0815 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	09-15-1995 1755 BR
pH	8.35	----	pH units	EPA 150.1	09-15-1995 1755 BR
Potassium, Total	2	1	mg/l	EPA 258.1	09-19-1995 0945 MK
Sodium, Total	24	1	mg/l	EPA 273.1	09-19-1995 1200 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1995 1615 SW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	09-18-1995 1145 JC
Solids, Total Suspended	120	5	mg/l	EPA 160.2	09-18-1995 0730 JC
Sulfate	47	1	mg/l	EPA 375.4	10-11-1995 1000 BR
Turbidity	70.0	0.1	NTU	EPA 180.1	09-15-1995 1600 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCF-1
Temperature 11.1°C
Flow 116 GPM
Rec'd 1530 hr.
Sampled 1151 hr.

FIELD MEASUREMENTS

pH	8.70
Conductivity	384
DO	6.9

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15433

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	8.7	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow R

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

JUL 1 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCLF-1
Temperature 9.0°C
Flow NA GST 400GPM
Rec'd 1615 hr.
Sampled 1020 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.
Nitric bottle preserved at Lab.

Analysis report no. 59-15124

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
lkalinity, Bicarbonate	410	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	370	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	8.50	----	meq/l	---------	---------- ----- --
Calcium, Total	95	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	8.80	----	meq/l	---------	---------- ----- --
Chloride	6	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	604	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	410	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	2.6	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-04-1995 0930 ED
Magnesium, Total	43	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-10-1995 1220 JK
Oxygen, Dissolved	4.8	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	8.01	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	2	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	12	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845 MK
Solids, Total Dissolved	310	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	265	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	45	1	mg/l	EPA 375.4	07-10-1995 0730 SW
Turbidity	120.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 1 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCLF-1
Temperature 9.0°C
Flow NA
Rec'd 1615 hr.
Sampled 1020 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab.
Nitric bottle preserved at Lab.

Analysis report no. 59-15124

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.80	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF-2
Temperature 10.5°C
Flow 116 GPM
Rec'd 1530 hr.
Sampled 1220 hr.

FIELD MEASUREMENTS

pH	8.46
Conductivity	386
DO	6.9

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Analysis report no. 59-15434

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	230	5	mg/l as HCO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Total	200	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1300 SW
Anions	4.7	----	meq/l	---------	---------- ----- --
Calcium, Total	51	1	mg/l	EPA 215.1	09-20-1995 0745 MK
Cations	4.9	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	450	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	230	10	mg/l as $CaCO_3$	SM2340-B	09-20-1995 0745 MK
Iron, Total	1.4	0.1	mg/l	EPA 236.1	09-19-1995 0600 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	25	1	mg/l	EPA 242.1	09-20-1995 1100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-19-1995 0815 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	6.8	----	mg/l	EPA 360.1	09-15-1995 1755 BR
pH	8.33	----	pH units	EPA 150.1	09-15-1995 1755 BR
Potassium, Total	1	1	mg/l	EPA 258.1	09-19-1995 0945 MK
Sodium, Total	7	1	mg/l	EPA 273.1	09-19-1995 1200 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1995 1615 SW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	09-18-1995 1145 JC
Solids, Total Suspended	75	5	mg/l	EPA 160.2	09-18-1995 0730 JC
Sulfate	25	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	45.0	0.1	NTU	EPA 180.1	09-15-1995 1600 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

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October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCF-2
Temperature 10.5°C
Flow 116 GPM
Rec'd 1530 hr.
Sampled 1220 hr.

FIELD MEASUREMENTS

pH	8.46
Conductivity	386
DO	6.9

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15434

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.0	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow R

Manager, Huntington Laboratory

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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF 3
Temperature 6.8°C
Flow 19 GPM
Rec'd 1630 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	8.04
Conductivity	710
DO	5.3

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14866

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	370	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	325	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	8.20	----	meq/l	---------	---------- ----- --
Calcium, Total	83	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	8.70	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	759	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	400	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	47	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-06-1995 1530 LM
Oxygen, Dissolved	5.6	----	mg/l	EPA 360.1	03-29-1995 1335 ED
pH	7.88	----	pH units	EPA 150.1	03-29-1995 1630 ED
Potassium, Total	3	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	15	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-30-1995 0730 SW
Solids, Total Dissolved	400	10	mg/l	EPA 160.1	03-30-1995 0800 SW
Solids, Total Suspended	5	5	mg/l	EPA 160.2	03-31-1995 0800 SW
Sulfate	70	1	mg/l	EPA 375.4	04-06-1995 0900 SW
Turbidity	1.5	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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Sample identification by
PACIFICORP FIELD OFFICE

RCF 3
Temperature 6.8°C
Flow 19 GPM
Rec'd 1630 hr.
Sampled 1400 hr.

FIELD MEASUREMENTS

pH	8.04
Conductivity	710
DO	5.3

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14866

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

JUL 1 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCF-3
Temperature 7.0°C
Flow NA EST @ 10 CFS / 4,500 GPM
Rec'd 1615 hr.
Sampled 1344 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab. Due to high TSS, sample would not balance.

Analysis report no. 59-15125

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
Alkalinity, Bicarbonate	270	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	250	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	5.40	----	meq/l	---------	---------- ----- --
Calcium, Total	90	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	6.90	----	meq/l	---------	---------- ----- --
Chloride	4	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	443	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	330	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	3.0	0.1	mg/l	EPA 236.1	07-05-1995 1000 ED
Iron, Dissolved	0.4	0.1	mg/l	EPA 236.1	07-04-1995 0930 ED
Magnesium, Total	25	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-10-1995 1220 JK
Oxygen, Dissolved	4.6	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	8.24	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	<1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	7	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845 MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	250	5	mg/l	EPA 160.2	06-29-1995 0930 JC
Sulfate	10	1	mg/l	EPA 375.4	07-10-1995 0730 SW
Turbidity	90.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout GS

Manager, Huntington Laboratory

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July 14, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
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JUL 17 1995
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Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCF-3
Temperature 7.0°C
Flow NA
Rec'd 1615 hr.
Sampled 1344 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab. Due to high TSS, sample would not balance.

Analysis report no. 59-15125

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	11.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCF-3
Temperature 11.7°C
Flow 26.87 GPM
Rec'd 1530 hr.
Sampled 1231 hr.

FIELD MEASUREMENTS

pH	8.19
Conductivity	458
DO	6.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15435

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	285	5	mg/l as HCO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	09-25-1995 1300 SW
Alkalinity, Total	240	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1300 SW
Anions	5.5	----	meq/l	---------	---------- ----- --
Calcium, Total	59	1	mg/l	EPA 215.1	09-20-1995 0745 MK
Cations	6.0	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	530	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	279	10	mg/l as $CaCO_3$	SM2340-B	09-20-1995 0745 MK
Iron, Total	1.1	0.1	mg/l	EPA 236.1	09-19-1995 0600 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	32	1	mg/l	EPA 242.1	09-20-1995 1100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-19-1995 0815 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	09-15-1995 1755 BR
pH	8.06	----	pH units	EPA 150.1	09-15-1995 1755 BR
Potassium, Total	2	1	mg/l	EPA 258.1	09-19-1995 0945 MK
Sodium, Total	9	1	mg/l	EPA 273.1	09-19-1995 1200 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1995 1615 SW
Solids, Total Dissolved	270	10	mg/l	EPA 160.1	09-18-1995 1145 JC
Solids, Total Suspended	50	5	mg/l	EPA 160.2	09-18-1995 0730 JC
Sulfate	31	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	35.0	0.1	NTU	EPA 180.1	09-15-1995 1600 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCF-3
Temperature 11.7°C
Flow 26.87 GPM
Rec'd 1530 hr.
Sampled 1231 hr.

FIELD MEASUREMENTS

pH	8.19
Conductivity	458
DO	6.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15435

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	4.5	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JAN - 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF-3
Temperature 5.6°C
Flow 25 GPM
Rec'd 1600 hr.
Sampled 1111 hr.

FIELD MEASUREMENTS
pH 8.40
Conductivity 643
DO 7.4

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15708

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-15-1995 0630	SW
Alkalinity, Bicarbonate	415	5	mg/l as HCO_3	SM2320-B	12-26-1995 1030	SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1030	SW
Alkalinity, Total	340	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1030	SW
Anions	8.6	----	meq/l	---------	---------- -----	--
Calcium, Total	76	1	mg/l	EPA 215.1	12-15-1995 1530	MK
Cations	8.1	----	meq/l	---------	---------- -----	--
Chloride	8	1	mg/l	SM4500-Cl-B	12-21-1995 0930	BR
Conductivity	742	1	umhos/cm	SM2510-B	12-15-1995 1615	SW
Hardness, Total	379	10	mg/l as $CaCO_3$	SM2340-B	12-15-1995 1530	MK
Iron, Total	0.2	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Magnesium, Total	46	1	mg/l	EPA 242.1	12-15-1995 1600	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-18-1995 1015	MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-21-1995 0900	JC
Oxygen, Dissolved	7.1	----	mg/l	EPA 360.1	12-14-1995 1730	BR
pH	8.15	----	pH units	EPA 150.1	12-14-1995 1700	BR
Potassium, Total	2	1	mg/l	EPA 258.1	12-18-1995 1045	MK
Sodium, Total	13	1	mg/l	EPA 273.1	12-18-1995 1100	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-15-1995 0700	MK
Solids, Total Dissolved	470	10	mg/l	EPA 160.1	12-15-1995 0730	JC
Solids, Total Suspended	10	5	mg/l	EPA 160.2	12-15-1995 1200	JC
Sulfate	76	1	mg/l	EPA 375.4	12-28-1995 0700	SW
Turbidity	2.0	0.1	NTU	EPA 180.1	12-15-1995 0700	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JAN - 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCF-3
Temperature 5.6°C
Flow 25 GPM
Rec'd 1600 hr.
Sampled 1111 hr.

FIELD MEASUREMENTS

pH	8.40
Conductivity	643
DO	7.4

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15708

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-2.6	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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April 11, 1995

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P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

FIELD OFFICE

RCW 4
Temperature 5.2°C
Flow 184 GPM
Rec'd 1630 hr.
Sampled 1443 hr.

FIELD MEASUREMENTS

pH	8.06
Conductivity	802
DO	3.9

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14867

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	365	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	335	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	9.30	----	meq/l	---------	---------- ----- --
Calcium, Total	79	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	8.90	----	meq/l	---------	---------- ----- --
Chloride	13	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	823	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	390	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.2	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	46	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	04-06-1995 1530 LM
Oxygen, Dissolved	5.9	----	mg/l	EPA 360.1	03-29-1995 1335 ED
pH	8.29	----	pH units	EPA 150.1	03-29-1995 1630 ED
Potassium, Total	3	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	26	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-30-1995 0730 SW
Solids, Total Dissolved	460	10	mg/l	EPA 160.1	03-30-1995 0800 SW
Solids, Total Suspended	10	5	mg/l	EPA 160.2	03-31-1995 0800 SW
Sulfate	110	1	mg/l	EPA 375.4	04-06-1995 0900 SW
Turbidity	1.1	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCW 4
Temperature 5.2°C
Flow 184 GPM
Rec'd 1630 hr.
Sampled 1443 hr.

FIELD MEASUREMENTS

pH	8.06
Conductivity	802
DO	3.9

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14867

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-2.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

July 17, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Rilda Canyon RCW-4
Temperature 7.5°C
Flow ~~NA~~ EST 10 CFS
Rec'd 1615 hr.
Sampled 1401 hr.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled June 28, 1995

Date received June 28, 1995

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Dissolved metals filtered at Lab. Due to high TSS, sample would not balance.

Analysis report no. 59-15126

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
Alkalinity, Bicarbonate	310	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	275	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	6.10	----	meq/l	---------	---------- ----- --
Calcium, Total	100	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	7.70	----	meq/l	---------	---------- ----- --
Chloride	5	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	476	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	370	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	3.8	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-04-1995 0930 ED
Magnesium, Total	29	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oxygen, Dissolved	5.0	----	mg/l	EPA 360.1	06-29-1995 0700 MK
pH	8.15	----	pH units	EPA 150.1	06-29-1995 0630 SW
Potassium, Total	1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	8	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	0.5	0.5	ml/l	EPA 160.5	06-29-1995 0845 MK
Solids, Total Dissolved	260	10	mg/l	EPA 160.1	06-29-1995 1030 JC
Solids, Total Suspended	290	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	20	1	mg/l	EPA 375.4	07-10-1995 0730 SW
Turbidity	100.0	0.1	NTU	EPA 180.1	06-29-1995 1200 MK
Cation/Anion Balance	11.40	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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TEL: (801) 653-2311
FAX: (801) 653-2436

July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4

Kind of sample reported to us Water

Rec'd 1025 hr.
Sampled 0800 - 1000 hr.

Sample taken at Rilda Canyon

NOTE: Sample temperature above 6.0°C when received.

Sample taken by Energy West/DON

Date sampled July 5, 1995

Date received July 5, 1995

Analysis report no. 59-15149

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4
Temperature 11.6°C
Flow 150 GPM
Rec'd 1530 hr.
Sampled 1312 hr.

FIELD MEASUREMENTS
pH 8.53
Conductivity 618
DO 6.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15436

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	325	5	mg/l as HCO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1400 SW
Alkalinity, Total	280	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1400 SW
Anions	7.5	----	meq/l	---------	---------- ----- --
Calcium, Total	65	1	mg/l	EPA 215.1	09-20-1995 0745 MK
Cations	7.7	----	meq/l	---------	---------- ----- --
Chloride	11	1	mg/l	SM4500-Cl-B	09-28-1995 1300 SW
Conductivity	685	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	352	10	mg/l as $CaCO_3$	SM2340-B	09-20-1995 0745 MK
Iron, Total	0.3	0.1	mg/l	EPA 236.1	09-19-1995 0600 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	09-26-1995 1415 MK
Magnesium, Total	46	1	mg/l	EPA 242.1	09-20-1995 1100 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-19-1995 0815 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-20-1995 0800 JC
Oxygen, Dissolved	7.6	----	mg/l	EPA 360.1	09-15-1995 1755 BR
pH	8.22	----	pH units	EPA 150.1	09-15-1995 1755 BR
Potassium, Total	2	1	mg/l	EPA 258.1	09-19-1995 0945 MK
Sodium, Total	16	1	mg/l	EPA 273.1	09-19-1995 1200 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-14-1995 1615 SW
Solids, Total Dissolved	460	10	mg/l	EPA 160.1	09-18-1995 1145 JC
Solids, Total Suspended	15	5	mg/l	EPA 160.2	09-18-1995 0730 JC
Sulfate	74	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	17.0	0.1	NTU	EPA 180.1	09-15-1995 1600 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 4, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 5 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KRH

Date sampled September 15, 1995

Date received September 15, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4
Temperature 11.6°C
Flow 150 GPM
Rec'd 1530 hr.
Sampled 1312 hr.

FIELD MEASUREMENTS

pH	9.53
Conductivity	618
DO	6.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15436

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.4	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4
Temperature 4.3°C
Flow 165 GPM
Rec'd 1600 hr.
Sampled 1150 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	724
DO	7.2

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15709

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-15-1995 0630 SW
Alkalinity, Bicarbonate	420	5	mg/l as HCO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1030 SW
Alkalinity, Total	345	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1030 SW
Anions	9.2	----	meq/l	---------	---------- ----- --
Calcium, Total	74	1	mg/l	EPA 215.1	12-15-1995 1530 MK
Cations	9.5	----	meq/l	---------	---------- ----- --
Chloride	13	1	mg/l	SM4500-Cl-B	12-21-1995 0930 BR
Conductivity	837	1	umhos/cm	SM2510-B	12-15-1995 1615 SW
Hardness, Total	424	10	mg/l as $CaCO_3$	SM2340-B	12-15-1995 1530 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-18-1995 0815 MK
Magnesium, Total	58	1	mg/l	EPA 242.1	12-15-1995 1600 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-18-1995 1015 MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-21-1995 0900 JC
Oxygen, Dissolved	7.8	----	mg/l	EPA 360.1	12-14-1995 1730 BR
pH	8.39	----	pH units	EPA 150.1	12-14-1995 1700 BR
Potassium, Total	3	1	mg/l	EPA 258.1	12-18-1995 1045 MK
Sodium, Total	24	1	mg/l	EPA 273.1	12-18-1995 1100 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-15-1995 0700 MK
Solids, Total Dissolved	500	10	mg/l	EPA 160.1	12-15-1995 0730 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	12-15-1995 1200 JC
Sulfate	94	1	mg/l	EPA 375.4	12-28-1995 0700 SW
Turbidity	1.4	0.1	NTU	EPA 180.1	12-15-1995 0700 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
~~FAX: (801) 653-2000~~
FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

RCW-4
Temperature 4.3°C
Flow .65 GPM
Rec'd 1600 hr.
Sampled 1150 hr.

FIELD MEASUREMENTS

pH	8.69
Conductivity	724
DO	7.2

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Rilda Canyon

Sample taken by Energy West/KH

Date sampled December 14, 1995

Date received December 14, 1995

Analysis report no. 59-15709

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.7	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

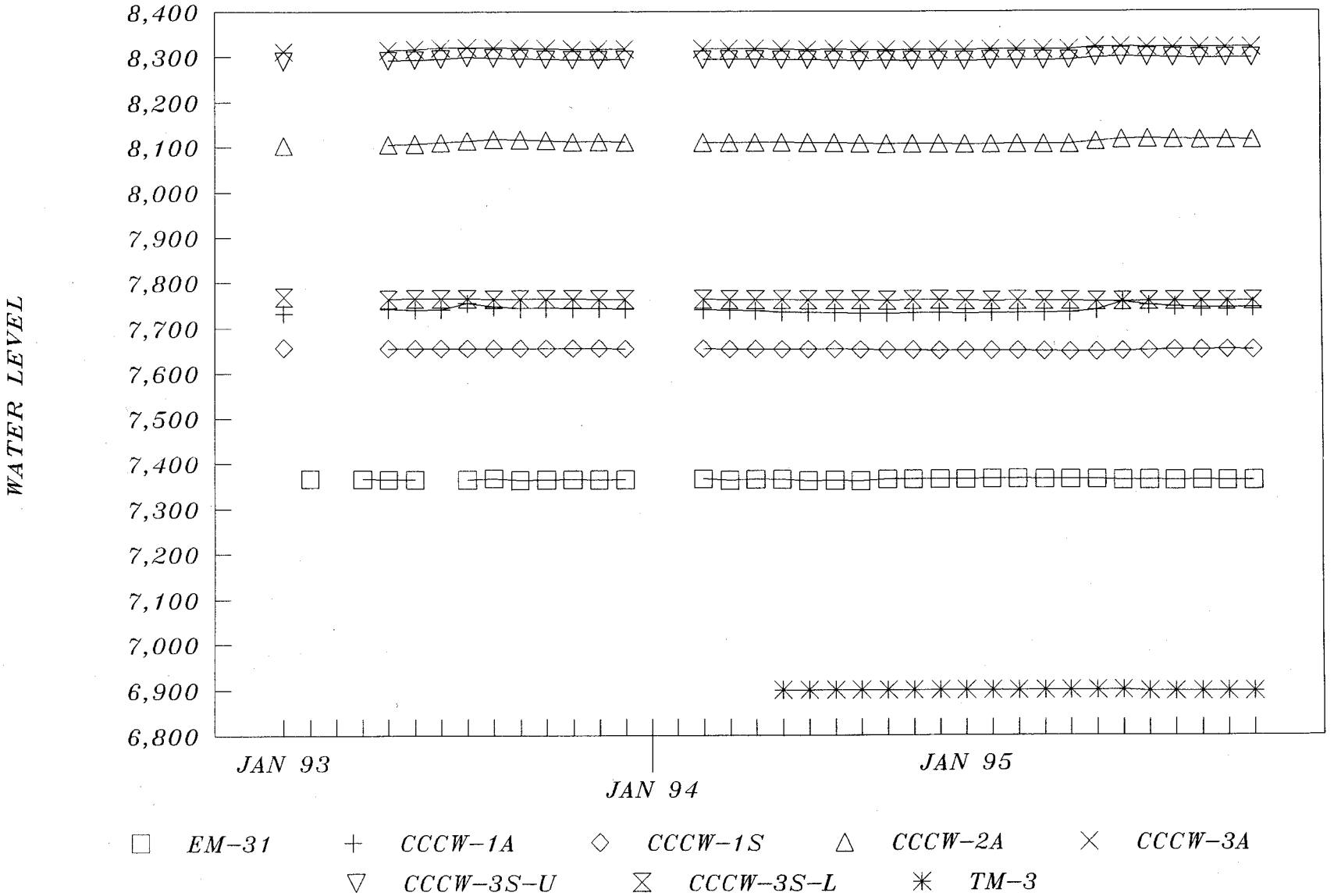
Larry Stoo R

Manager, Huntington Laboratory

APPENDIX E

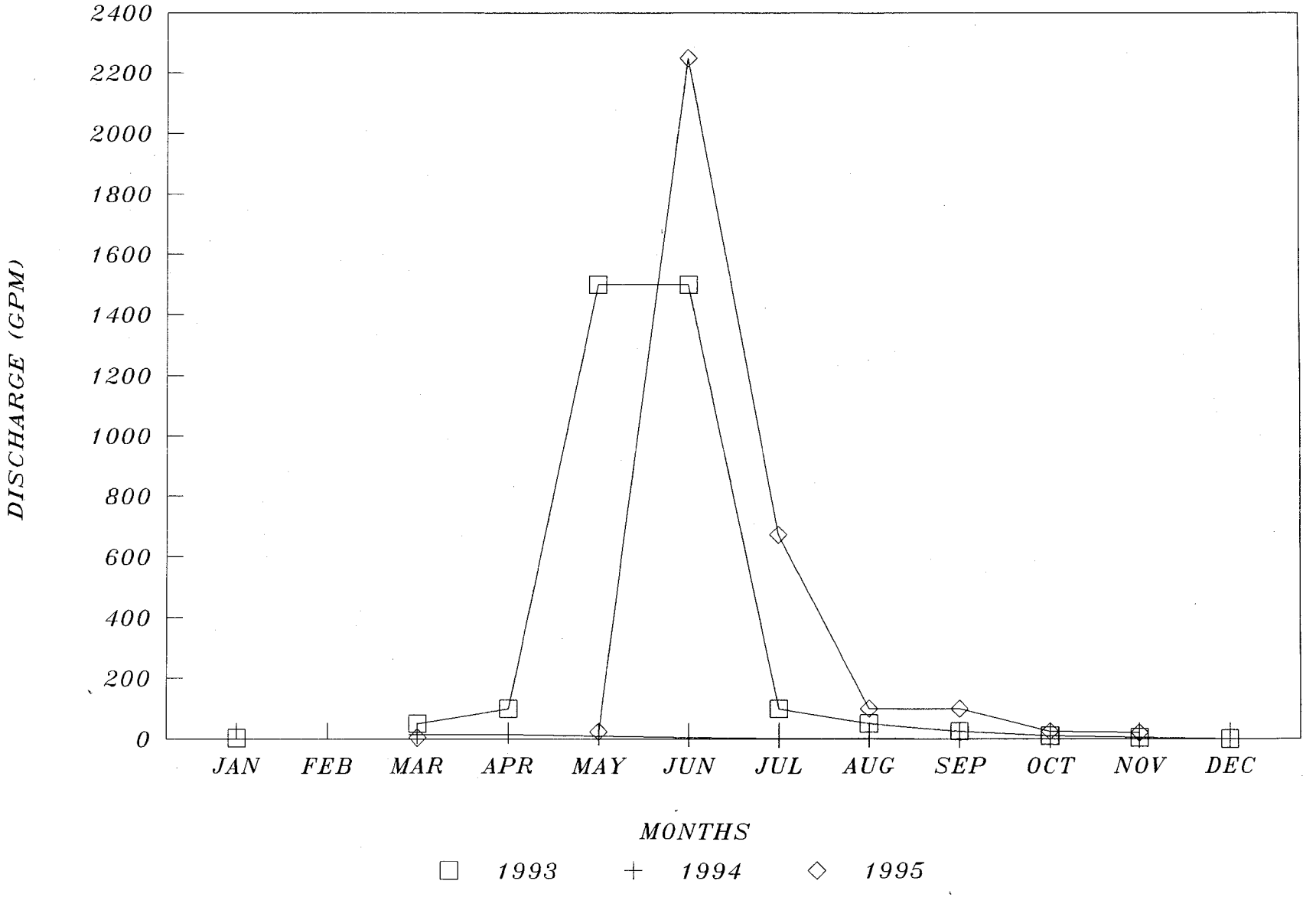
COTTONWOOD CANYON CREEK

Piezometric Study



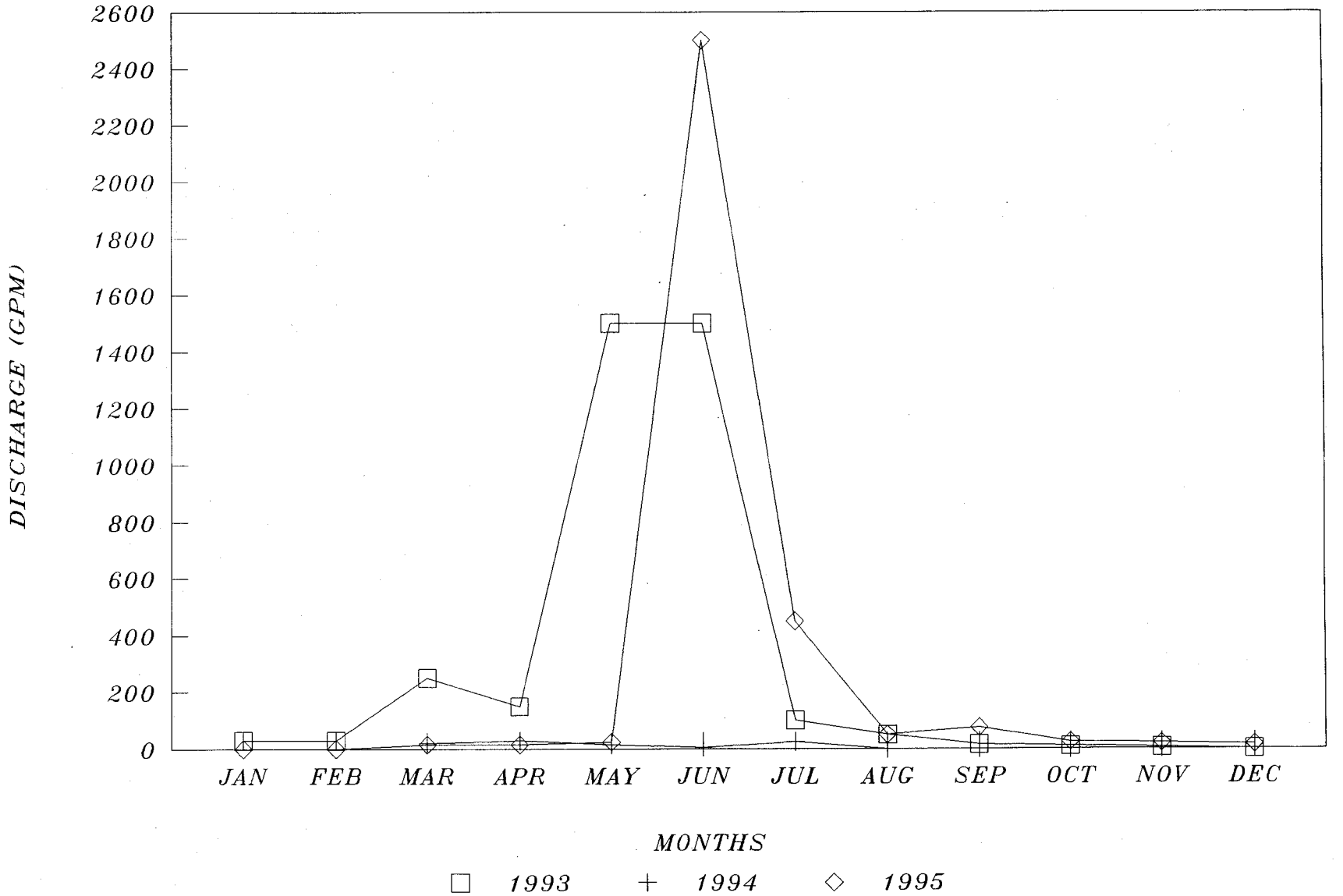
COTTONWOOD CANYON CREEK: SW-1

Drainage Recession Curve Study



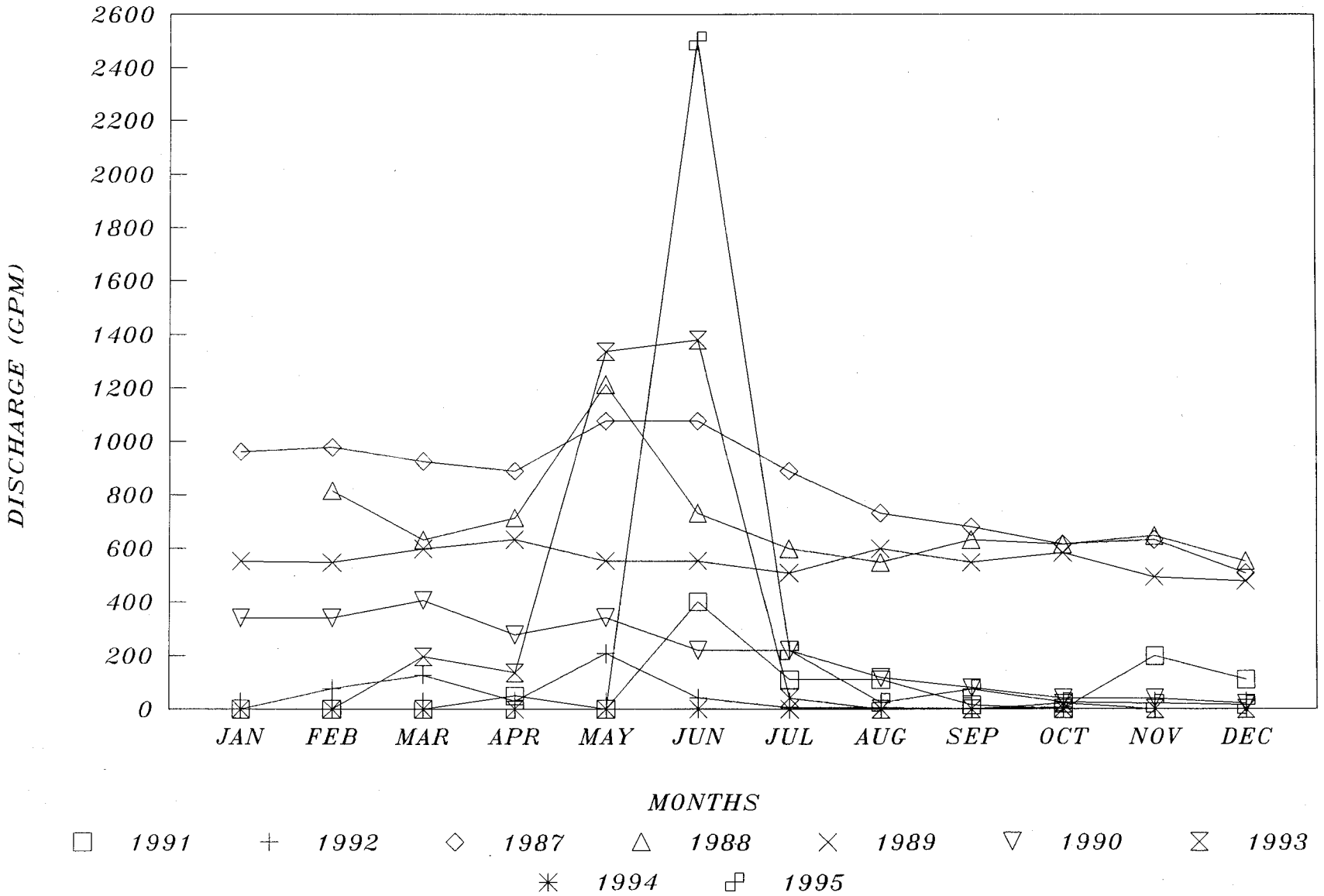
COTTONWOOD CANYON CREEK: SW-2

Drainage Recession Curve Study



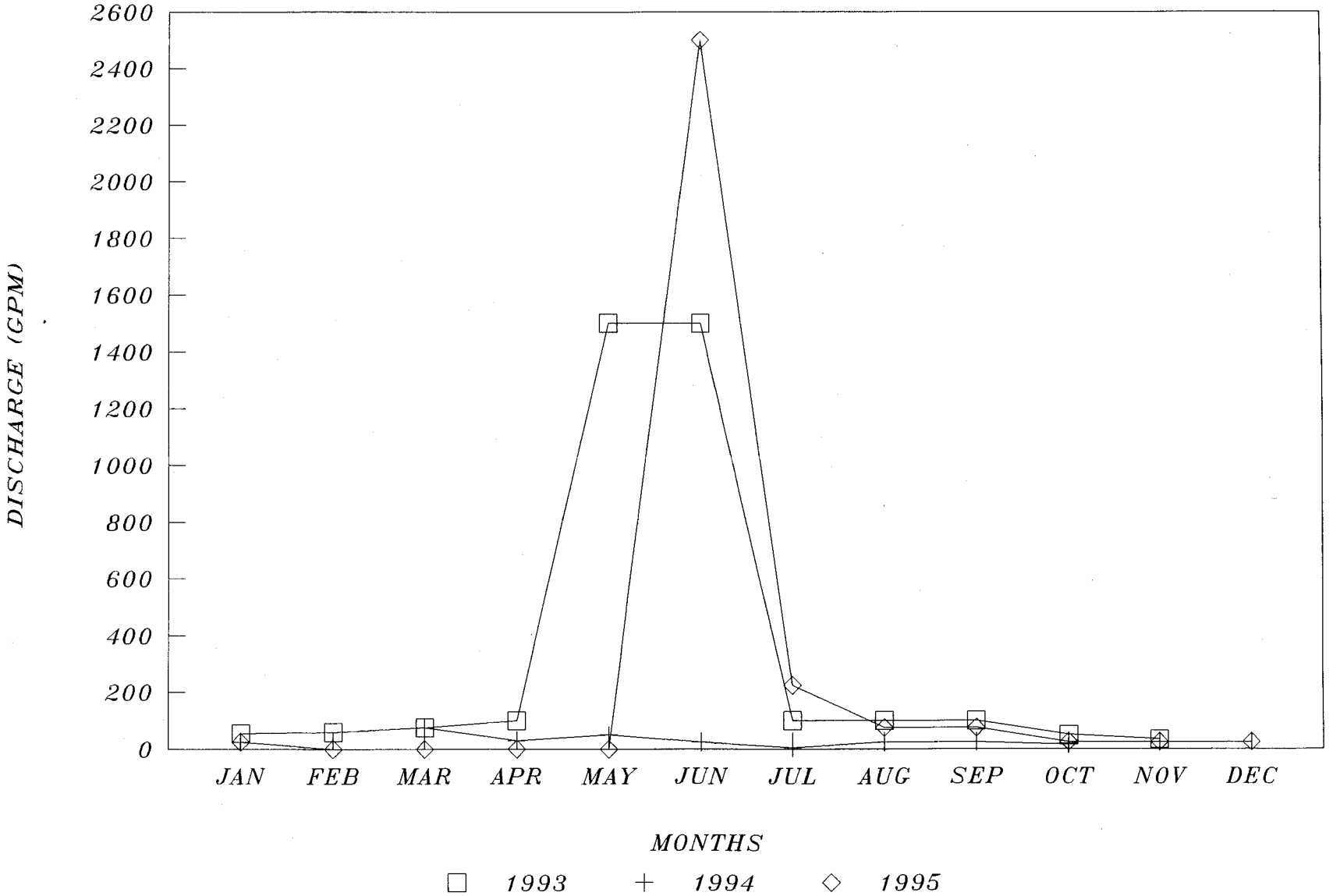
COTTONWOOD CANYON CREEK @ USGS FLUME

Drainage Recession Curve Study



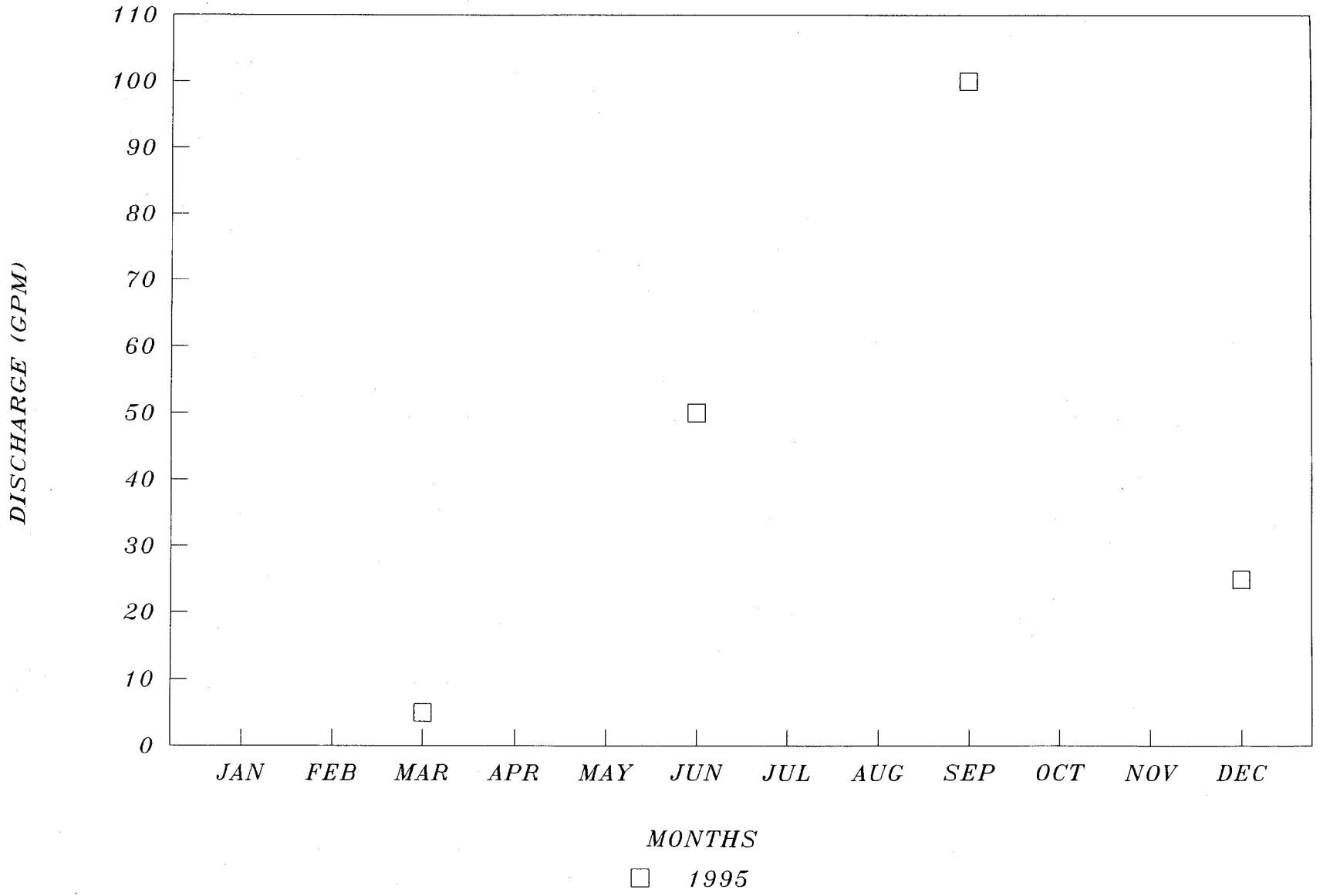
COTTONWOOD CANYON CREEK: SW-3

Drainage Recession Curve Study



STRAIGHT CANYON: T-19

Drainage Recession Curve Study



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RECEIVED
4/12/95

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-1

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 3.3°C
Flow 5 GPM
Rec'd 1310 hr.
Sampled 0930 hr.

FIELD MEASUREMENTS

pH	8.34
Conductivity	961
DO	3.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14858

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	395	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	355	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	11.40	----	meq/l	---------	---------- ----- --
Calcium, Total	81	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	12.10	----	meq/l	---------	---------- ----- --
Chloride	27	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	1084	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	520	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.1	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	78	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	5.8	----	mg/l	EPA 360.1	03-29-1995 1335 LM
pH	8.14	----	pH units	EPA 150.1	03-29-1995 1600 LM
Potassium, Total	3	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	38	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-29-1995 1445 LM
Solids, Total Dissolved	690	10	mg/l	EPA 160.1	04-03-1995 1500 SW
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	03-29-1995 1400 SW
Sulfate	170	1	mg/l	EPA 375.4	04-03-1995 1030 LM
Turbidity	0.8	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

RECEIVED
4/12/95

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-1

Temperature 3.3°C
Flow 5 GPM
Rec'd 1310 hr.
Sampled 0930 hr.

FIELD MEASUREMENTS

pH	8.34
Conductivity	961
DO	3.8

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14858

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Terry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-1

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Temperature 9.0°C
Flow 2244 GPM
Rec'd 1400 hr.
Sampled 1125 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Analysis report no. 59-15138

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
cidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	290	5	mg/l as HCO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Total	265	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1300 SW
Anions	6.20	----	meq/l	---------	---------- ----- --
Calcium, Total	6	1	mg/l	EPA 215.1	07-05-1995 1510 MK
Cations	6.40	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	502	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	300	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	1.5	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-05-1995 1255 MK
Magnesium, Total	28	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	06-29-1995 1705 SW
pH	8.13	----	pH units	EPA 150.1	06-29-1995 1615 SW
Potassium, Total	1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	11	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 1530 SW
Solids, Total Dissolved	280	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	105	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	25	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	35.0	0.1	NTU	EPA 180.1	07-03-1995 0755 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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TEL: (801) 653-2311
FAX: (801) 653-2436

July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-1

Temperature 9.0°C
Flow 2244 GPM
Rec'd 1400 hr.
Sampled 1125 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15138

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-1
Temperature 12.3°C
Flow 100 GPM
Rec'd 1700 hr.
Sampled 1608 hr.

FIELD MEASUREMENTS

pH	8.16
Conductivity	700
DO	6.6

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Analysis report no. 59-15477

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	10-03-1995 1000 SW
Alkalinity, Bicarbonate	370	5	mg/l as HCO_3	SM2320-B	10-03-1995 1000 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	10-03-1995 1000 SW
Alkalinity, Total	325	5	mg/l as $CaCO_3$	EPA 310.1	10-03-1995 1000 SW
Anions	8.9	----	meq/l	---------	---------- ----- --
Calcium, Total	74	1	mg/l	EPA 215.1	10-03-1995 1145 MK
Cations	8.9	----	meq/l	---------	---------- ----- --
Chloride	16	1	mg/l	SM4500-Cl-B	10-04-1995 0700 SW
Conductivity	794	1	umhos/cm	SM2510-B	10-04-1995 1430 SW
Hardness, Total	395	10	mg/l as $CaCO_3$	SM2340-B	10-03-1995 1145 MK
Iron, Total	1.0	0.1	mg/l	EPA 236.1	10-03-1995 1315 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-12-1995 0915 MK
Magnesium, Total	51	1	mg/l	EPA 242.1	10-03-1995 1200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-03-1995 1345 MK
Oil & Grease	<5	5	mg/l	SM5520-B	10-03-1995 1000 JC
Oxygen, Dissolved	5.8	----	mg/l	EPA 360.1	09-29-1995 1000 BR
pH	7.89	----	pH units	EPA 150.1	09-29-1995 0830 BR
Potassium, Total	2	1	mg/l	EPA 258.1	10-03-1995 1430 MK
Sodium, Total	23	1	mg/l	EPA 273.1	10-03-1995 1500 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-29-1995 0900 MK
Solids, Total Dissolved	430	10	mg/l	EPA 160.1	09-29-1995 0815 JC
Solids, Total Suspended	35	5	mg/l	EPA 160.2	10-02-1995 0730 JC
Sulfate	91	1	mg/l	EPA 375.4	10-13-1995 1300 SW
Turbidity	23.0	0.1	NTU	EPA 180.1	09-29-1995 0830 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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FAX: (801) 653-2436

October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-1
Temperature 12.3°C
Flow 100 GPM
Rec'd 1700 hr.
Sampled 1608 hr.

FIELD MEASUREMENTS

pH	8.16
Conductivity	700
DO	6.6

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Analysis report no. 59-15477

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-0.1	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow Jr

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 3.1°C
Flow 15 GPM
Rec'd 1310 hr.
Sampled 0954 hr.

FIELD MEASUREMENTS

pH	8.67
Conductivity	955
DO	3.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14859

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	325	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	35	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	325	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	11.60	----	meq/l	---------	---------- ----- --
Calcium, Total	74	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	11.70	----	meq/l	---------	---------- ----- --
Chloride	40	1	mg/l	SM4500-Cl-B	03-31-1995 1200 ED
Conductivity	1074	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	490	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	73	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	6.8	----	mg/l	EPA 360.1	03-29-1995 1335 LM
pH	8.60	----	pH units	EPA 150.1	03-29-1995 1600 LM
Potassium, Total	4	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	46	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-29-1995 1445 LM
Solids, Total Dissolved	700	10	mg/l	EPA 160.1	04-03-1995 1500 SW
Solids, Total Suspended	10	5	mg/l	EPA 160.2	03-29-1995 1400 SW
Sulfate	190	1	mg/l	EPA 375.4	04-03-1995 1030 LM
Turbidity	1.5	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hart CD

Manager, Huntington Laboratory

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April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 3.1°C
Flow 15 GPM
Rec'd 1310 hr.
Sampled 0954 hr.

FIELD MEASUREMENTS

pH	8.67
Conductivity	955
DO	3.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14859

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	0.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Temperature 9.0°C
Flow 1700 GPM Est.
Rec'd 1400 hr.
Sampled 1113 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Analysis report no. 59-15139

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	290	5	mg/l as HCO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Total	270	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1300 SW
Anions	6.30	----	meq/l	---------	---------- ----- --
Calcium, Total	71	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	6.50	----	meq/l	---------	---------- ----- --
Chloride	8	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	515	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	300	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	1.1	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-05-1995 1255 MK
Magnesium, Total	30	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	10	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	06-29-1995 1705 SW
pH	8.24	----	pH units	EPA 150.1	06-29-1995 1615 SW
Potassium, Total	1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	12	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 1530 SW
Solids, Total Dissolved	350	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	85	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	32	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	29.0	0.1	NTU	EPA 180.1	07-03-1995 0755 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Hunt CD

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2

Temperature 9.0°C
Flow 1700 GPM Est.
Rec'd 1400 hr.
Sampled 1113 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15139

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-2
Temperature 12.0°C
Flow 75 GPM
Rec'd 1700 hr.
Sampled 1621 hr.

FIELD MEASUREMENTS

pH	8.71
Conductivity	715
DO	6.6

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Analysis report no. 59-15478

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	10-03-1995 0800	SW
Alkalinity, Bicarbonate	320	5	mg/l as HCO_3	SM2320-B	10-03-1995 1000	SW
Alkalinity, Carbonate	30	5	mg/l as CO_3	SM2320-B	10-03-1995 1000	SW
Alkalinity, Total	315	5	mg/l as $CaCO_3$	EPA 310.1	10-03-1995 1000	SW
Anions	9.2	----	meq/l	---------	---------- -----	--
Calcium, Total	63	1	mg/l	EPA 215.1	10-03-1995 1145	MK
Cations	9.5	----	meq/l	---------	---------- -----	--
Chloride	27	1	mg/l	SM4500-Cl-B	10-04-1995 0700	SW
Conductivity	821	1	umhos/cm	SM2510-B	10-04-1995 1430	SW
Hardness, Total	404	10	mg/l as $CaCO_3$	SM2340-B	10-03-1995 1145	MK
Iron, Total	0.9	0.1	mg/l	EPA 236.1	10-03-1995 1315	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-12-1995 0915	MK
Magnesium, Total	60	1	mg/l	EPA 242.1	10-03-1995 1200	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-03-1995 1345	MK
Oil & Grease	<5	5	mg/l	SM5520-B	10-03-1995 1000	JC
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	09-29-1995 1000	BR
pH	8.35	----	pH units	EPA 150.1	09-29-1995 0830	BR
Potassium, Total	3	1	mg/l	EPA 258.1	10-03-1995 1430	MK
Sodium, Total	33	1	mg/l	EPA 273.1	10-03-1995 1500	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-29-1995 0900	MK
Solids, Total Dissolved	540	10	mg/l	EPA 160.1	09-29-1995 0815	JC
Solids, Total Suspended	45	5	mg/l	EPA 160.2	10-02-1995 0730	JC
Sulfate	104	1	mg/l	EPA 375.4	10-13-1995 1300	SW
Turbidity	27.0	0.1	NTU	EPA 180.1	09-29-1995 0830	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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FAX: (801) 653-2436

October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-2
Temperature 12.0°C
Flow 75 GPM
Rec'd 1700 hr.
Sampled 1621 hr.

FIELD MEASUREMENTS

pH	8.71
Conductivity	715
DO	6.6

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Analysis report no. 59-15478

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.8	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stone

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-2
Temperature 2.7°C
Flow 15 GPM
Rec'd 1430 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	8.93
Conductivity	811
DO	8.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15737

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-18-1995 1600	BR
Alkalinity, Bicarbonate	440	5	mg/l as HCO_3	SM2320-B	12-26-1995 1500	SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	12-26-1995 1500	SW
Alkalinity, Total	380	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1500	SW
Anions	11.2	----	meq/l	---------	---------- -----	--
Calcium, Total	74	1	mg/l	EPA 215.1	12-20-1995 1330	MK
Cations	10.7	----	meq/l	---------	---------- -----	--
Chloride	27	1	mg/l	SM4500-Cl-B	12-27-1995 1300	SW
Conductivity	968	1	umhos/cm	SM2510-B	12-27-1995 1500	SW
Hardness, Total	465	10	mg/l as $CaCO_3$	SM2340-B	12-20-1995 1330	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Magnesium, Total	68	1	mg/l	EPA 242.1	12-20-1995 1430	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-21-1995 0930	MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-29-1995 0900	JC
Oxygen, Dissolved	8.9	----	mg/l	EPA 360.1	12-18-1995 1600	BR
pH	8.61	----	pH units	EPA 150.1	12-18-1995 1600	BR
Potassium, Total	3	1	mg/l	EPA 258.1	12-21-1995 1015	MK
Sodium, Total	33	1	mg/l	EPA 273.1	12-21-1995 1045	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-19-1995 0700	MK
Solids, Total Dissolved	610	10	mg/l	EPA 160.1	12-20-1995 0730	JC
Solids, Total Suspended	5	5	mg/l	EPA 160.2	12-20-1995 1000	JC
Sulfate	136	1	mg/l	EPA 375.4	01-02-1996 0800	SW
Turbidity	2.3	0.1	NTU	EPA 180.1	12-19-1995 0715	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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TELEPHONE: (801) 653-2311
FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
-9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-2
Temperature 2.7°C
Flow 15 GPM
Rec'd 1430 hr.
Sampled 1145 hr.

FIELD MEASUREMENTS

pH	8.93
Conductivity	811
DO	8.8

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15737

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	~2.2	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

PACIFICORP
TECHNICAL SERVICES - HYDROLOGIC MONITORING

COTTONWOOD CANYON CREEK
@ USGS FLUME

	<----------		Field Measurements -- -------->					
			Flow			Cond.	Dis.	
Date	Time	Temp. (°C)	ft.	GPM	pH	(uS)	Oxygen	Weather Comments
04-Jan-94	945			frozen-no flow				cloudy 20's
07-Feb-94	1100			frozen-no flow				snow 20's
24-Mar-94	1248			no flow				cloudy light snow 40's
28-Apr-94	1206			no flow				snow 30's
17-May-94	1620			no flow				cloudy windy 40's
22-Jun-94	1425			no flow				clear 80's
21-Jul-94	1107			no flow				clear 80's
23-Aug-94	1107			no flow				clear 80's
12-Sep-94	1250			no flow				cloudy 60's
31-Oct-94	1330			no flow				cloudy 50's
17-Nov-94	1137			no flow				clear 20's
19-Dec-94	1130			no flow				clear 30's
31-Jan-95	1125			no flow				cloudy 30's
06-Feb-95	1130			no flow				clear 30's
29-Mar-95	924			no flow				snowing 20's
21-Apr-95	1045			no flow				snowing 30's
08-May-95	1106			no flow				clear 70's
29-Jun-95	1050	9		2500+	meter repair			clear 70's
17-Jul-95	1045	9	0.30	218				cloudy 80's
30-Aug-95	1208	16		25	8.76	650	8.3	clear 70's
28-Sep-95	1627	14		75				rain 40's
30-Nov-95	1519	4		20	8.46	808	8.1	rain 40's
18-Dec-95	1128	3		15	8.85	846	8.4	clear 30's

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-3

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Temperature 12.0°C
Flow 1735 GPM
Rec'd 1400 hr.
Sampled 1035 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Analysis report no. 59-15140

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	290	5	mg/l as HCO_3	SM2320-B	07-06-1995 1300
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Total	260	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1300 SW
Anions	6.10	----	meq/l	---------	---------- ----- --
Calcium, Total	71	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	6.70	----	meq/l	---------	---------- ----- --
Chloride	7	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	506	1	umhos/cm	SM2510-B	06-29-1995 151[illegible] MK
Hardness, Total	310	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 13[illegible] MK
Iron, Total	1.3	0.1	mg/l	EPA 236.1	07-05-1995 10[illegible] ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-05-1995 1255 MK
Magnesium, Total	32	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	6.5	----	mg/l	EPA 360.1	06-29-1995 1705 SW
pH	8.21	----	pH units	EPA 150.1	06-29-1995 1615 SW
Potassium, Total	1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	12	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 1530 SW
Solids, Total Dissolved	380	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	95	5	mg/l	EPA 160.2	07-05-1995 0820 JC
Sulfate	30	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	33.0	0.1	NTU	EPA 180.1	07-03-1995 0755 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout SD

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-3

Temperature 12.0°C
Flow 1795 GPM
Rec'd 1400 hr.
Sampled 1035 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15140

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	4.90	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 15.0°C
Flow 75 GPM
Rec'd 1700 hr.
Sampled 1636 hr.

FIELD MEASUREMENTS

pH	8.35
Conductivity	1178
DO	7.9

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Analysis report no. 59-15479

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	10	10	mg/l as $CaCO_3$	D1067-92	10-03-1995 0800 SW
Alkalinity, Bicarbonate	385	5	mg/l as HCO_3	SM2320-B	10-03-1995 1000 S
Alkalinity, Carbonate	30	5	mg/l as CO_3	SM2320-B	10-03-1995 1000 SW
Alkalinity, Total	365	5	mg/l as $CaCO_3$	EPA 310.1	10-03-1995 1000 SW
Anions	15.9	----	meq/l	---------	---------- ----- --
Calcium, Total	98	1	mg/l	EPA 215.1	10-03-1995 1145 MK
Cations	16.8	----	meq/l	---------	---------- ----- --
Chloride	56	1	mg/l	SM4500-Cl-B	10-04-1995 0700 SW
Conductivity	1423	1	umhos/cm	SM2510-B	10-04-1995 1430 SW
Hardness, Total	644	10	mg/l as $CaCO_3$	SM2340-B	10-03-1995 1145 MK
Iron, Total	0.1	0.1	mg/l	EPA 236.1	10-03-1995 1315 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-12-1995 0915 MK
Magnesium, Total	97	1	mg/l	EPA 242.1	10-03-1995 1200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-03-1995 1345 MK
Oil & Grease	<5	5	mg/l	SM5520-B	10-03-1995 1000 JC
Oxygen, Dissolved	6.3	----	mg/l	EPA 360.1	09-29-1995 1000 BR
pH	7.96	----	pH units	EPA 150.1	09-29-1995 0830 BR
Potassium, Total	4	1	mg/l	EPA 258.1	10-03-1995 1430 MK
Sodium, Total	90	1	mg/l	EPA 273.1	10-03-1995 1500 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-29-1995 0900 MK
Solids, Total Dissolved	960	10	mg/l	EPA 160.1	09-29-1995 0815 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	10-02-1995 0730 JC
Sulfate	339	1	mg/l	EPA 375.4	10-13-1995 1500 SW
Turbidity	2.2	0.1	NTU	EPA 180.1	09-29-1995 0830 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Cottonwood Canyon Creek

Sample taken by Energy West/CAS

Date sampled September 28, 1995

Date received September 28, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 15.0°C
Flow 75 GPM
Rec'd 1700 hr.
Sampled 1636 hr.

FIELD MEASUREMENTS

pH	8.35
Conductivity	1178
DO	7.9

NOTE: Dissolved metals filtered at Lab. pH and DO expired when analyzed.

Analysis report no. 59-15479

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.6	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stone

Manager, Huntington Laboratory

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January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
-9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 2.9°C
Flow 25 GPM
Rec'd 1430 hr.
Sampled 1112 hr.

FIELD MEASUREMENTS

pH	8.64
Conductivity	1184
DO	7.7

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15739

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst	
Acidity	10	10	mg/l as $CaCO_3$	D1067-92	12-26-1995 0730	SW
Alkalinity, Bicarbonate	420	5	mg/l as HCO_3	SM2320-B	12-26-1995 1500	
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1500	SW
Alkalinity, Total	345	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1500	SW
Anions	15.8	----	meq/l	---------	---------- -----	--
Calcium, Total	102	1	mg/l	EPA 215.1	12-20-1995 1330	MK
Cations	17.0	----	meq/l	---------	---------- -----	--
Chloride	54	1	mg/l	SM4500-Cl-B	12-27-1995 1300	SW
Conductivity	1418	1	umhos/cm	SM2510-B	12-27-1995 1500	SW
Hardness, Total	654	10	mg/l as $CaCO_3$	SM2340-B	12-20-1995 1330	MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830	MK
Magnesium, Total	97	1	mg/l	EPA 242.1	12-20-1995 1430	MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-21-1995 0930	MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-29-1995 0900	JC
Oxygen, Dissolved	8.5	----	mg/l	EPA 360.1	12-18-1995 1600	BR
pH	8.26	----	pH units	EPA 150.1	12-18-1995 1600	BR
Potassium, Total	3	1	mg/l	EPA 258.1	12-21-1995 1015	MK
Sodium, Total	90	1	mg/l	EPA 273.1	12-21-1995 1045	MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-19-1995 0700	MK
Solids, Total Dissolved	950	10	mg/l	EPA 160.1	12-20-1995 0730	JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	12-20-1995 1000	JC
Sulfate	355	1	mg/l	EPA 375.4	01-02-1996 0800	SW
Turbidity	1.0	0.1	NTU	EPA 180.1	12-19-1995 0715	MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

- 9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

SW-3
Temperature 2.9°C
Flow 25 GPM
Rec'd 1430 hr.
Sampled 1112 hr.

FIELD MEASUREMENTS

pH	8.64
Conductivity	1184
DO	7.7

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Analysis report no. 59-15739

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	3.5	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

STRAIGHT CANYON WATER QUALITY *

T-19

1995 SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	SOLIDS TSS	SOLIDS TDS	SOLIDS SETTLEABLE
3-95	10.0	335	58.0	20.0	41.0	1062	6.00	430	0.50	0.10	70.00	0.10	5.0	8.42	4.00	84.00	160.0	50.0	680	0.50
6-95	10.0	340	54.0	20.0	22.0	614	6.20	300	1.20	0.10	41.00	0.10	5.0	7.99	1.00	35.00	39.0	115.0	360	0.50
9-95	10.0	300	50.0	20.0	21.0	623	8.50	310	1.00	0.10	45.00	0.10	5.0	8.15	2.00	34.00	48.0	55.0	380	0.50
12-95	10.0	275	60.0	10.0	31.0	986	10.40	426	0.50	0.10	67.00	0.10	5.0	8.87	2.00	61.00	132.0	35.0	640	0.50
1995																				
MIN	10.0	275	50.0	10.0	21.0	614	6.00	300	0.50	0.10	41.00	0.10	5.0	7.99	1.00	34.00	39.0	35.0	360	0.50
MAX	10.0	340	60.0	20.0	41.0	1062	10.40	430	1.20	0.10	70.00	0.10	5.0	8.87	4.00	84.00	160.0	115.0	680	0.50
MEAN	10.0	312.5	55.5	17.5	28.8	821.3	7.8	366.5	0.8	0.1	55.8	0.1	5.0	8.4	2.3	53.5	94.8	63.8	515.0	0.5
No. of Analysis	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
HISTORICAL 1977-1994																				
MIN	1.0	258	14.3	1.0	20.1	600	5.40	178	0.05	0.03	24.00	0.01	7.4	0.70	12.00	50.00	1.0	418.0	418	0.50
MAX	10.0	435	92.0	26.1	67.9	1380	11.10	476	5.10	0.38	85.00	0.20	5.0	8.82	30.20	125.20	336.0	420.0	910	0.50
MEAN	4.3	357	43.6	12.6	41.5	969	8.80	357	0.56	0.18	60.44	0.04	3.5	8.34	4.45	78.90	176.0	67.0	584	0.50
No. of Analysis	8	22	22	13	22	18	3	22	17	9	22	13	5	21	21	22	22	17	22	3

* Quality parameters are reported as mg/l unless otherwise noted.

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April 11, 1995

RECEIVED
4/12/95
FIELD OFFICE

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

T-19

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 0.8°C
Flow 5 GPM
Rec'd 1310 hr.
Sampled 0856 hr.

FIELD MEASUREMENTS

pH	8.42
Conductivity	992
DO	6.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14856

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	335	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	305	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	10.60	----	meq/l	---------	---------- ----- --
Calcium, Total	58	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	12.30	----	meq/l	---------	---------- ----- --
Chloride	41	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	1062	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	430	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.5	0.1	mg/l	EPA 236.1	04-05-1995 0930 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	70	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	5.6	----	mg/l	EPA 360.1	03-29-1995 1335 LM
pH	8.37	----	pH units	EPA 150.1	03-29-1995 1600 LM
Potassium, Total	4	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	84	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-29-1995 1445 LM
Solids, Total Dissolved	680	10	mg/l	EPA 160.1	04-03-1995 1500 SW
Solids, Total Suspended	50	5	mg/l	EPA 160.2	03-29-1995 1400 SW
Sulfate	160	1	mg/l	EPA 375.4	04-03-1995 1030 LM
Turbidity	12.0	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES INC.

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

F-465/059/95
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4/12/95
FIELD OFFICE

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

Sample identification by
PACIFICORP FIELD OFFICE

T-19

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 0.8°C
Flow 5 GPM
Rec'd 1310 hr.
Sampled 0856 hr.

FIELD MEASUREMENTS

pH	8.42
Conductivity	992
DO	6.0

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14856

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	7.20	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19

Temperature 12.0°C
Flow 50 GPM Est.
Rec'd 1400 hr.
Sampled 0957 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15136

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 1000 SW
Alkalinity, Bicarbonate	340	5	mg/l as HCO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	07-06-1995 1300 SW
Alkalinity, Total	310	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 1300 SW
Anions	7.70	----	meq/l	---------	---------- ----- --
Calcium, Total	54	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	7.60	----	meq/l	---------	---------- ----- --
Chloride	22	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	614	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	300	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	1.2	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-05-1995 1255 MK
Magnesium, Total	41	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-14-1995 0755 JK
Oxygen, Dissolved	6.2	----	mg/l	EPA 360.1	06-29-1995 1705 SW
pH	7.99	----	pH units	EPA 150.1	06-29-1995 1615 SW
Potassium, Total	1	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	35	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 1530 SW
Solids, Total Dissolved	360	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	115	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	39	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	52.0	0.1	NTU	EPA 180.1	07-03-1995 0755 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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TEL: (801) 653-2311
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July 21, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 21 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Temperature 12.0°C
Flow 50 GPM Est.
Rec'd 1400 hr.
Sampled 0957 hr.

NOTE: Turbidity expired when analyzed.
Dissolved metals filtered at Lab.

Analysis report no. 59-15136

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	-0.50	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout CD

Manager, Huntington Laboratory

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October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 10.3°C
Flow 100 GPM
Rec'd 1605 hr.
Sampled 1103 hr.

FIELD MEASUREMENTS

pH	8.15
Conductivity	581
DO	8.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/GD

Date sampled September 27, 1995

Date received September 27, 1995

Analysis report no. 59-15469

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	10-03-1995 0800 SW
lkalinity, Bicarbonate	300	5	mg/l as HCO_3	SM2320-B	10-03-1995 1000 SW
Alkalinity, Carbonate	20	5	mg/l as CO_3	SM2320-B	10-03-1995 1000 SW
Alkalinity, Total	280	5	mg/l as $CaCO_3$	EPA 310.1	10-03-1995 1000 SW
Anions	7.2	----	meq/l	---------	---------- ----- --
Calcium, Total	50	1	mg/l	EPA 215.1	10-03-1995 1145 MK
Cations	7.7	----	meq/l	---------	---------- ----- --
Chloride	21	1	mg/l	SM4500-Cl-B	10-04-1995 0700 SW
Conductivity	623	1	umhos/cm	SM2510-B	10-04-1995 1430 SW
Hardness, Total	310	10	mg/l as $CaCO_3$	SM2340-B	10-03-1995 1145 MK
Iron, Total	1.0	0.1	mg/l	EPA 236.1	10-03-1995 1315 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-12-1995 0915 MK
Magnesium, Total	45	1	mg/l	EPA 242.1	10-03-1995 1200 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	10-03-1995 1345 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-28-1995 0830 JC
Oxygen, Dissolved	6.7	----	mg/l	EPA 360.1	09-27-1995 1645 BR
pH	8.40	----	pH units	EPA 150.1	09-27-1995 1620 BR
Potassium, Total	2	1	mg/l	EPA 258.1	10-03-1995 1430 MK
Sodium, Total	34	1	mg/l	EPA 273.1	10-03-1995 1500 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-28-1995 0730 SW
Solids, Total Dissolved	380	10	mg/l	EPA 160.1	09-29-1995 0815 JC
Solids, Total Suspended	55	5	mg/l	EPA 160.2	10-02-1995 0730 JC
Sulfate	48	1	mg/l	EPA 375.4	10-13-1995 1300 SW
Turbidity	23.0	0.1	NTU	EPA 180.1	09-28-1995 0715 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.

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FAX: (801) 653-2436

October 20, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 20 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/GD

Date sampled September 27, 1995

Date received September 27, 1995

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 10.3°C
Flow 100 GPM
Rec'd 1605 hr.
Sampled 1103 hr.

FIELD MEASUREMENTS

pH	8.15
Conductivity	581
DO	8.5

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15469

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	3.4	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
- 9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 2.5°C
Flow 25 GPM
Rec'd 1430 hr.
Sampled 1036 hr.

FIELD MEASUREMENTS

pH	8.87
Conductivity	838
DO	10.4

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15735

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-26-1995 0730 SW
Alkalinity, Bicarbonate	275	5	mg/l as HCO_3	SM2320-B	12-26-1995 1500 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	12-26-1995 1500 SW
Alkalinity, Total	245	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1500 SW
Anions	10.9	----	meq/l	---------	---------- ----- --
Calcium, Total	60	1	mg/l	EPA 215.1	12-20-1995 1330 MK
Cations	11.2	----	meq/l	---------	---------- ----- --
Chloride	31	1	mg/l	SM4500-Cl-B	12-27-1995 1300 SW
Conductivity	986	1	umhos/cm	SM2510-B	12-27-1995 1500 SW
Hardness, Total	426	10	mg/l as $CaCO_3$	SM2340-B	12-20-1995 1330 MK
Iron, Total	0.5	0.1	mg/l	EPA 236.1	12-21-1995 0830 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830 MK
Magnesium, Total	67	1	mg/l	EPA 242.1	12-20-1995 1430 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-21-1995 0930 MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-28-1995 0800 JC
Oxygen, Dissolved	8.2	----	mg/l	EPA 360.1	12-18-1995 1600 BR
pH	8.58	----	pH units	EPA 150.1	12-18-1995 1600 BR
Potassium, Total	2	1	mg/l	EPA 258.1	12-21-1995 1015 MK
Sodium, Total	61	1	mg/l	EPA 273.1	12-21-1995 1045 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-19-1995 0700 MK
Solids, Total Dissolved	640	10	mg/l	EPA 160.1	12-20-1995 0730 JC
Solids, Total Suspended	35	5	mg/l	EPA 160.2	12-20-1995 1000 JC
Sulfate	132	1	mg/l	EPA 375.4	01-02-1996 0800 SW
Turbidity	22.0	0.1	NTU	EPA 180.1	12-19-1995 0715 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

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TELEPHONE: (801) 653-2311
FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
-9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

T-19
Temperature 2.5°C
Flow 25 GPM
Rec'd 1430 hr.
Sampled 1036 hr.

FIELD MEASUREMENTS

pH	8.87
Conductivity	838
DO	10.4

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Trail Mountain

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Analysis report no. 59-15735

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	1.0	----	%		

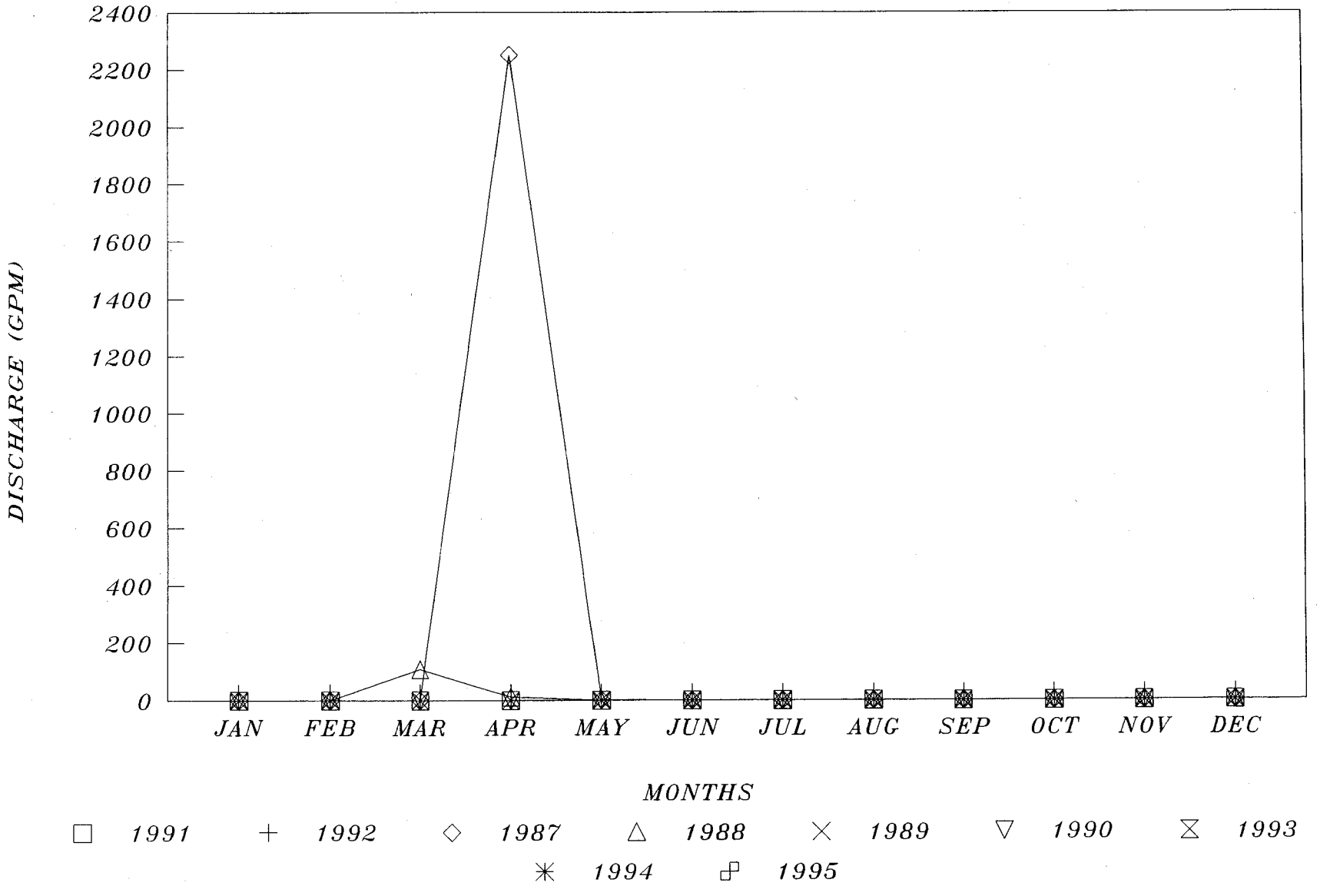
Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

APPENDIX F

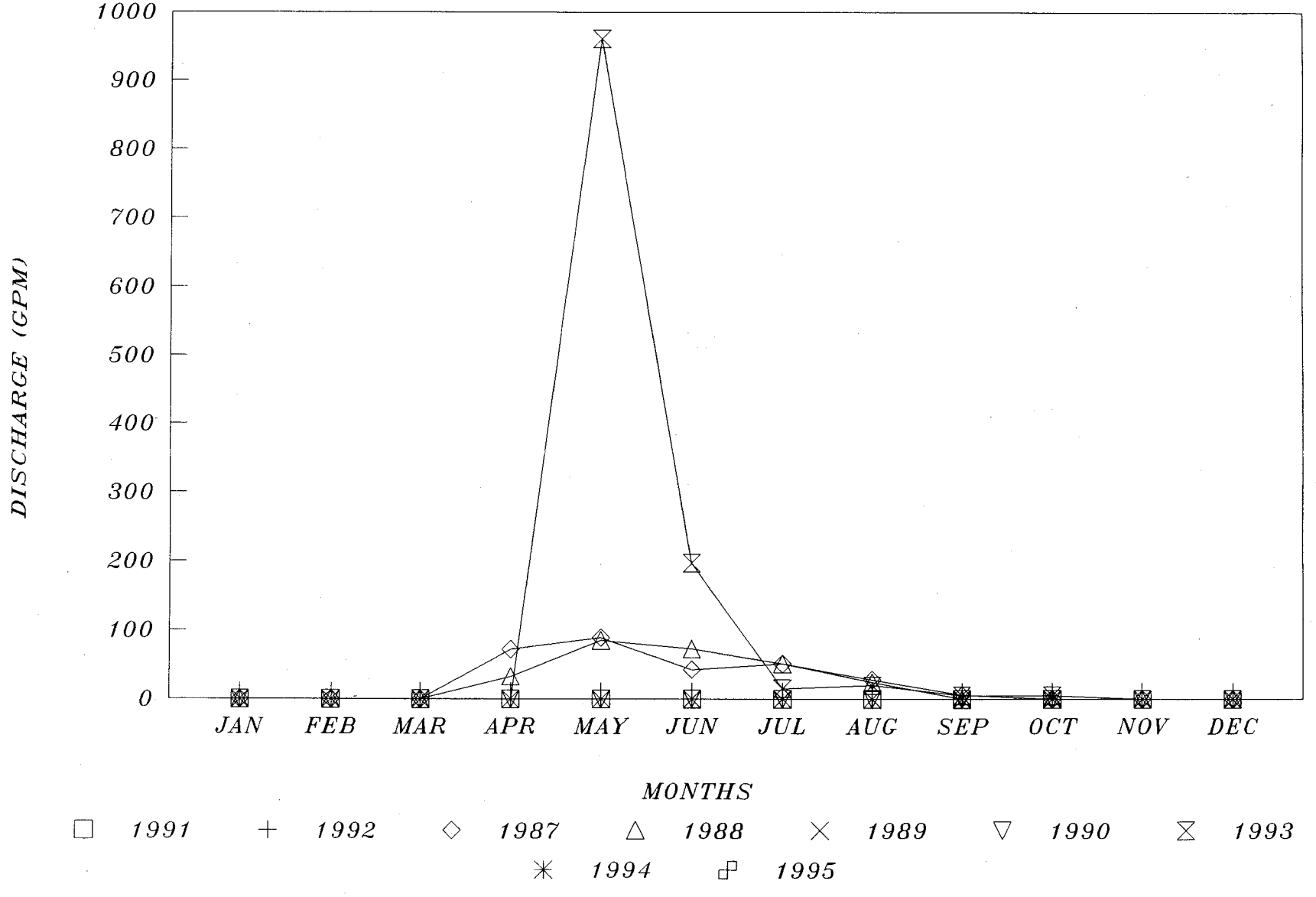
GRIMES WASH – RIGHT FORK ABOVE MINE

Drainage Recession Curve Study



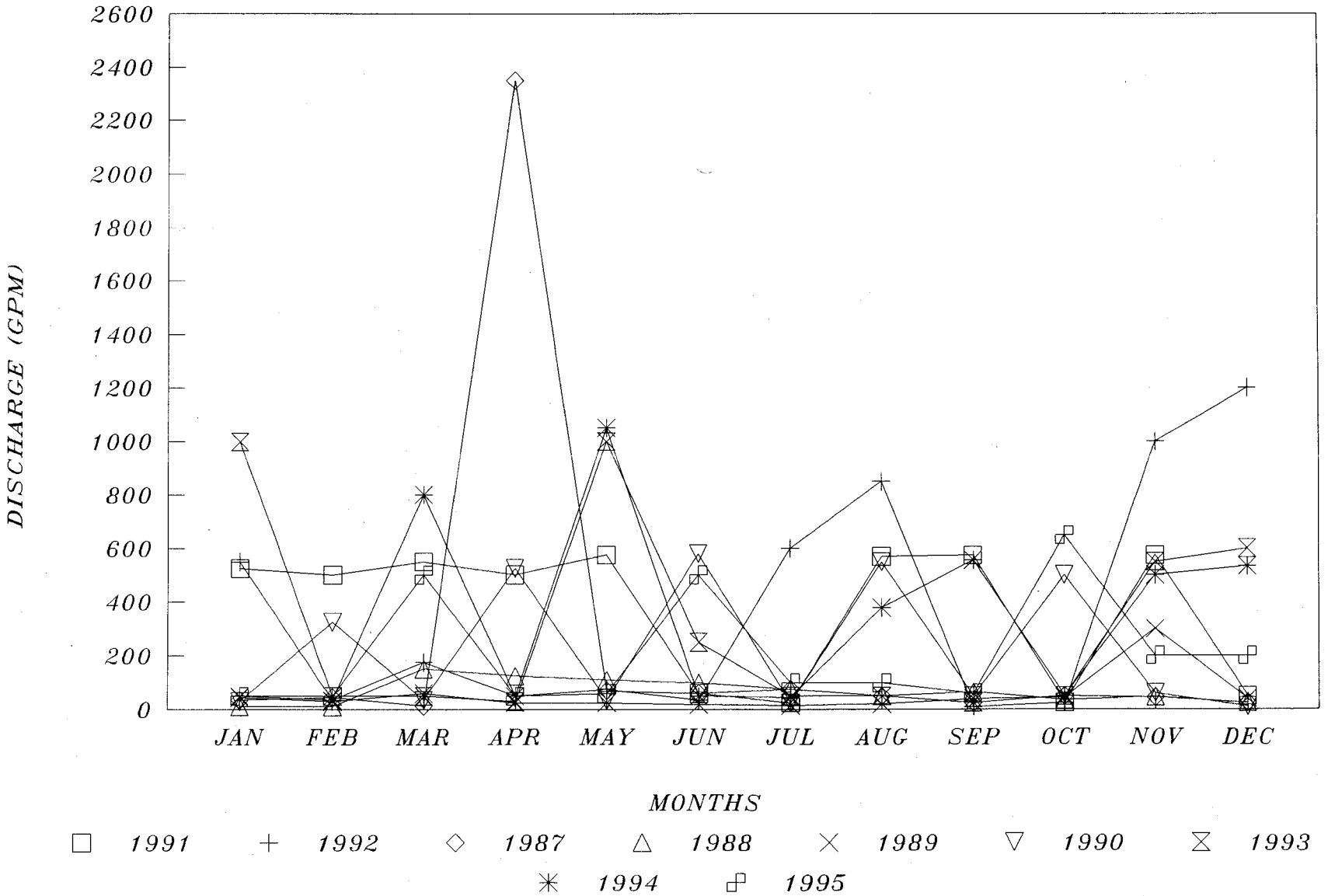
GRIMES WASH – LEFT FORK ABOVE MINE

Drainage Recession Curve Study



GRIMES WASH – BELOW MINE

Drainage Recession Curve Study



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RECEIVED
4/12/95

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GWR03

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Temperature 9.8°C
Flow 500 GPM
Rec'd 1310 hr.
Sampled 1047 hr.

FIELD MEASUREMENTS

pH	8.63
Conductivity	1100
DO	5.5

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-14855

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	04-04-1995 1100 SW
Alkalinity, Bicarbonate	325	5	mg/l as HCO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	03-31-1995 1000 ED
Alkalinity, Total	285	5	mg/l as $CaCO_3$	EPA 310.1	03-31-1995 1000 ED
Anions	11.90	----	meq/l	---------	---------- ----- --
Calcium, Total	90	1	mg/l	EPA 215.1	04-04-1995 1400 DW
Cations	13.20	----	meq/l	---------	---------- ----- --
Chloride	60	1	mg/l	SM4500-Cl-B	03-31-1995 1200 SW
Conductivity	1211	1	umhos/cm	SM2510-B	04-04-1995 1300 SW
Hardness, Total	480	10	mg/l as $CaCO_3$	SM2340-B	04-04-1995 1400 DW
Iron, Total	0.3	0.1	mg/l	EPA 236.1	04-05-1995 1600 DW
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	04-03-1995 0800 DW
Magnesium, Total	63	1	mg/l	EPA 242.1	04-04-1995 1600 DW
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	04-05-1995 1030 DW
Oil & Grease	<5	5	mg/l	EPA 413.1	03-30-1995 1325 LM
Oxygen, Dissolved	5.9	----	mg/l	EPA 360.1	03-29-1995 1335 LM
pH	8.01	----	pH units	EPA 150.1	03-29-1995 1600 LM
Potassium, Total	8	1	mg/l	EPA 258.1	04-05-1995 1130 DW
Sodium, Total	82	1	mg/l	EPA 273.1	04-05-1995 1400 DW
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	03-29-1995 1445 LM
Solids, Total Dissolved	760	10	mg/l	EPA 160.1	04-03-1995 1500 SW
Solids, Total Suspended	10	5	mg/l	EPA 160.2	03-29-1995 1400 SW
Sulfate	220	1	mg/l	EPA 375.4	04-03-1995 1030 LM
Turbidity	2.4	0.1	NTU	EPA 180.1	03-30-1995 1645 ED

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

April 11, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

RECEIVED
4/12/95

FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GWR03

Temperature 9.8°C
Flow 500 GPM
Rec'd 1310 hr.
Sampled 1047 hr.

FIELD MEASUREMENTS

pH	8.63
Conductivity	1100
DO	5.5

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/CS

Date sampled March 29, 1995

Date received March 29, 1995

Analysis report no. 59-14855

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	5.20	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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FAX: (801) 653-2436

July 17, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

GWR03 Grimes Wash Run-off
Temperature 11.0°C
Flow 500 GPM
Rec'd 1400 hr.
Sampled 1315 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Turbidity expired when analyzed.

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15135

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	SM2310-B	07-05-1995 0800 SW
Alkalinity, Bicarbonate	340	5	mg/l as HCO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Carbonate	15	5	mg/l as CO_3	SM2320-B	07-06-1995 0730 SW
Alkalinity, Total	280	5	mg/l as $CaCO_3$	EPA 310.1	07-06-1995 0730 SW
Anions	10.60	----	meq/l	---------	---------- ----- --
Calcium, Total	86	1	mg/l	EPA 215.1	07-05-1995 1350 MK
Cations	10.70	----	meq/l	---------	---------- ----- --
Chloride	27	1	mg/l	SM4500-Cl-B	07-07-1995 0730 SW
Conductivity	970	1	umhos/cm	SM2510-B	06-29-1995 1510 MK
Hardness, Total	440	10	mg/l as $CaCO_3$	SM2340-B	07-05-1995 1350 MK
Iron, Total	0.6	0.1	mg/l	EPA 236.1	07-05-1995 1010 ED
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	07-05-1995 1255 MK
Magnesium, Total	55	1	mg/l	EPA 242.1	07-05-1995 1440 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	07-05-1995 1100 ED
Oil & Grease	<5	5	mg/l	EPA 413.1	07-12-1995 0740 JK
Oxygen, Dissolved	6.7	----	mg/l	EPA 360.1	06-29-1995 1705 SW
pH	8.81	----	pH units	EPA 150.1	06-29-1995 1615 SW
Potassium, Total	7	1	mg/l	EPA 258.1	07-05-1995 1140 ED
Sodium, Total	44	1	mg/l	EPA 273.1	07-05-1995 1525 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	06-29-1995 1530 SW
Solids, Total Dissolved	650	10	mg/l	EPA 160.1	07-03-1995 1200 JC
Solids, Total Suspended	5	5	mg/l	EPA 160.2	06-30-1995 0930 JC
Sulfate	180	1	mg/l	EPA 375.4	07-11-1995 0730 SW
Turbidity	8.0	0.1	NTU	EPA 180.1	07-03-1995 0755 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • TEL: 708-953-9300 FAX: 708-953-9306
SINCE 1908
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P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

July 17, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
JUL 17 1995
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

GWR03 Grimes Wash Run-off
Temperature 11.0°C
Flow 500 GPM
Rec'd 1400 hr.
Sampled 1315 hr.

FIELD MEASUREMENTS

pH	NA
Conductivity	NA
DO	NA
Turbidity	NA

NOTE: Turbidity expired when analyzed.

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled June 29, 1995

Date received June 29, 1995

Analysis report no. 59-15135

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	0.70	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Wilberg Mine

Sample taken by Energy West/CS

Date sampled September 19, 1995

Date received September 19, 1995

Sample identification by
PACIFICORP FIELD OFFICE

GWR03
Temperature 15.5°C
Flow 60 GPM
Rec'd 1540 hr.
Sampled 1340 hr.

FIELD MEASUREMENTS

pH	8.46
Conductivity	1089
DO	8.3

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15449

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	09-25-1995 0800 SW
Alkalinity, Bicarbonate	315	5	mg/l as HCO_3	SM2320-B	09-25-1995 1430 SW
Alkalinity, Carbonate	10	5	mg/l as CO_3	SM2320-B	09-25-1995 1430 SW
Alkalinity, Total	275	5	mg/l as $CaCO_3$	EPA 310.1	09-25-1995 1430 SW
Anions	13.0	----	meq/l	---------	---------- ----- --
Calcium, Total	92	1	mg/l	EPA 215.1	09-28-1995 1200 MK
Cations	13.5	----	meq/l	---------	---------- ----- --
Chloride	94	1	mg/l	SM4500-Cl-B	09-28-1995 1400 SW
Conductivity	1261	1	umhos/cm	SM2510-B	10-02-1995 1230 SW
Hardness, Total	502	10	mg/l as $CaCO_3$	SM2340-B	09-28-1995 1200 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	09-28-1995 0745 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	10-12-1995 0900 MK
Magnesium, Total	66	1	mg/l	EPA 242.1	09-28-1995 1300 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	09-28-1995 0915 MK
Oil & Grease	<5	5	mg/l	SM5520-B	09-21-1995 0930 JC
Oxygen, Dissolved	3.8	----	mg/l	EPA 360.1	09-19-1995 1700 BR
pH	8.24	----	pH units	EPA 150.1	09-19-1995 1700 BR
Potassium, Total	7	1	mg/l	EPA 258.1	09-28-1995 1000 MK
Sodium, Total	81	1	mg/l	EPA 273.1	09-28-1995 1030 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	09-21-1995 0800 SW
Solids, Total Dissolved	850	10	mg/l	EPA 160.1	09-22-1995 0745 JC
Solids, Total Suspended	10	5	mg/l	EPA 160.2	09-22-1995 1030 JC
Sulfate	232	1	mg/l	EPA 375.4	10-02-1995 0800 SW
Turbidity	1.7	0.1	NTU	EPA 180.1	09-21-1995 0745 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stout

Manager, Huntington Laboratory

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PLEASE ADDRESS ALL CORRESPONDENCE T
P.O. BOX 1020, HUNTINGTON, UT 84528
TEL: (801) 653-2311
FAX: (801) 653-2436

October 12, 1995

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
OCT 12 1995
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Wilberg Mine

Sample taken by Energy West/CS

Date sampled September 19, 1995

Date received September 19, 1995

Sample identification by
PACIFICORP FIELD OFFICE

GWR03
Temperature 15.5°C
Flow 60 GPM
Rec'd 1540 hr.
Sampled 1340 hr.

FIELD MEASUREMENTS

pH	8.46
Conductivity	1089
DO	8.3

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15449

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.1	----	%		

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Larry Stow Jr

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
-9 1996
FIELD OFFICE

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GRW03
Temperature 5.9°C
Flow 200 GPM
Rec'd 1430 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.66
Conductivity	1128
DO	8.3

NOTE: Dissolved metals filtered at Lab.

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Analysis report no. 59-15732

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Acidity	<10	10	mg/l as $CaCO_3$	D1067-92	12-18-1995 1600 BR
Alkalinity, Bicarbonate	375	5	mg/l as HCO_3	SM2320-B	12-26-1995 1500 SW
Alkalinity, Carbonate	<5	5	mg/l as CO_3	SM2320-B	12-26-1995 1500 SW
Alkalinity, Total	310	5	mg/l as $CaCO_3$	EPA 310.1	12-26-1995 1500 SW
Anions	14.2	----	meq/l	---------	---------- ----- --
Calcium, Total	107	1	mg/l	EPA 215.1	12-20-1995 1330 MK
Cations	15.0	----	meq/l	---------	---------- ----- --
Chloride	91	1	mg/l	SM4500-Cl-B	12-27-1995 1230 SW
Conductivity	1359	1	umhos/cm	SM2510-B	12-27-1995 1500 SW
Hardness, Total	572	10	mg/l as $CaCO_3$	SM2340-B	12-20-1995 1330 MK
Iron, Total	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830 MK
Iron, Dissolved	<0.1	0.1	mg/l	EPA 236.1	12-21-1995 0830 MK
Magnesium, Total	74	1	mg/l	EPA 242.1	12-20-1995 1430 MK
Manganese, Total	<0.1	0.1	mg/l	EPA 243.1	12-21-1995 0930 MK
Oil & Grease	<5	5	mg/l	SM5520-B	12-28-1995 0800 JC
Oxygen, Dissolved	7.1	----	mg/l	EPA 360.1	12-18-1995 1600 BR
pH	8.36	----	pH units	EPA 150.1	12-18-1995 1600 BR
Potassium, Total	6	1	mg/l	EPA 258.1	12-21-1995 1015 MK
Sodium, Total	82	1	mg/l	EPA 273.1	12-21-1995 1045 MK
Solids, Settleable	<0.5	0.5	ml/l	EPA 160.5	12-19-1995 0700 MK
Solids, Total Dissolved	930	10	mg/l	EPA 160.1	12-19-1995 1200 JC
Solids, Total Suspended	<5	5	mg/l	EPA 160.2	12-20-1995 1000 JC
Sulfate	264	1	mg/l	EPA 375.4	01-02-1996 0800 SW
Turbidity	2.3	0.1	NTU	EPA 180.1	12-19-1995 0715 MK

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
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FAX: (801) 653-2436

January 7, 1996

PACIFICORP FIELD OFFICE
P.O. Box 1005
Huntington UT 84528

PACIFICORP
1-9 1996
FIELD OFFICE

Kind of sample reported to us Water

Sample taken at Grimes Wash

Sample taken by Energy West/KH

Date sampled December 18, 1995

Date received December 18, 1995

Sample identification by
PACIFICORP FIELD OFFICE

Grimes Wash Run-Off GRW03
Temperature 5.9°C
Flow 200 GPM
Rec'd 1430 hr.
Sampled 1300 hr.

FIELD MEASUREMENTS

pH	8.66
Conductivity	1128
DO	8.3

NOTE: Dissolved metals filtered at Lab.

Analysis report no. 59-15732

Parameter	Result	MDL	Units	Method	Analyzed Date/Time/Analyst
Cation/Anion Balance	2.6	----	%		

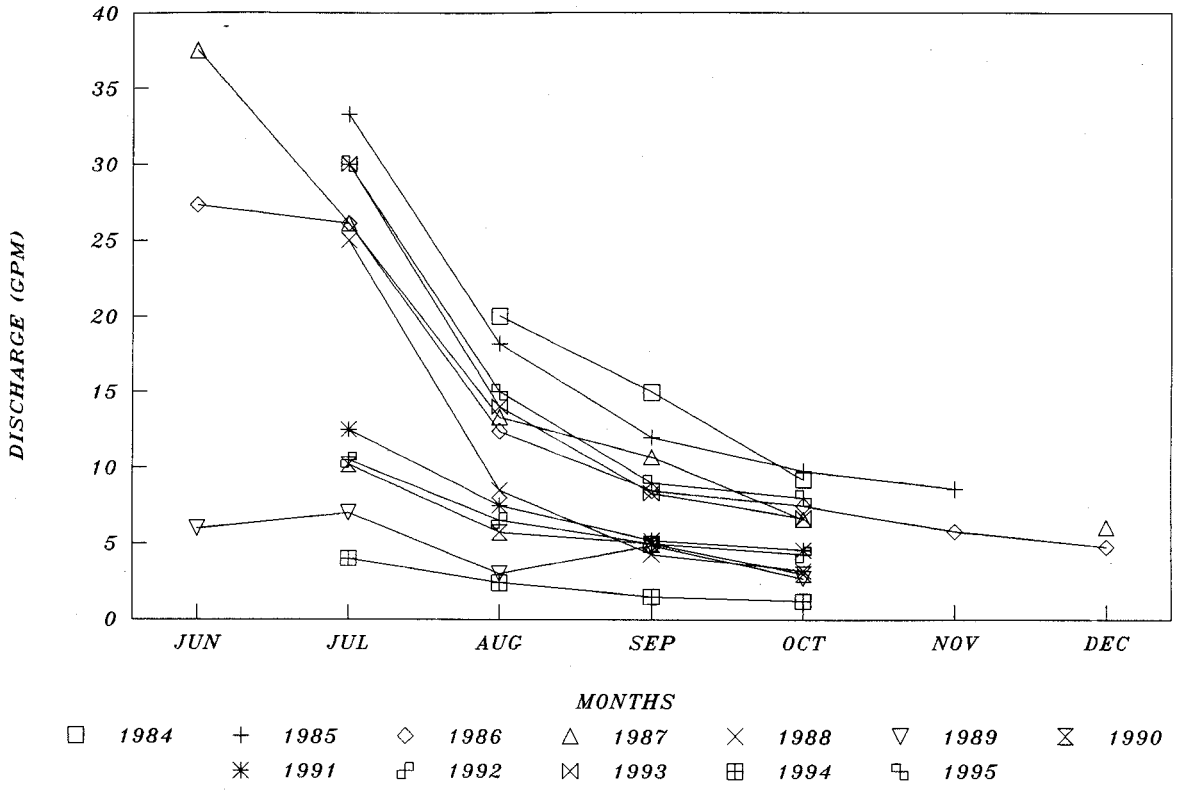
Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

APPENDIX G

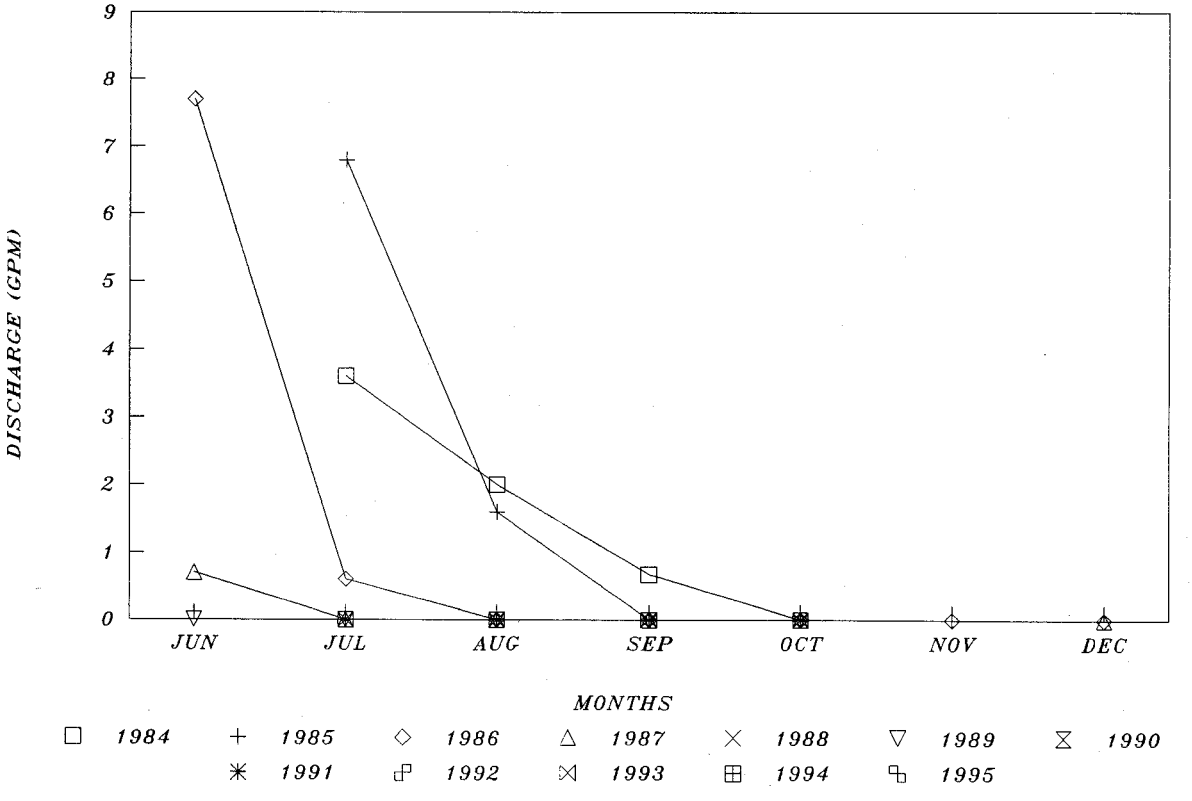
79-10

Discharge Recession Study



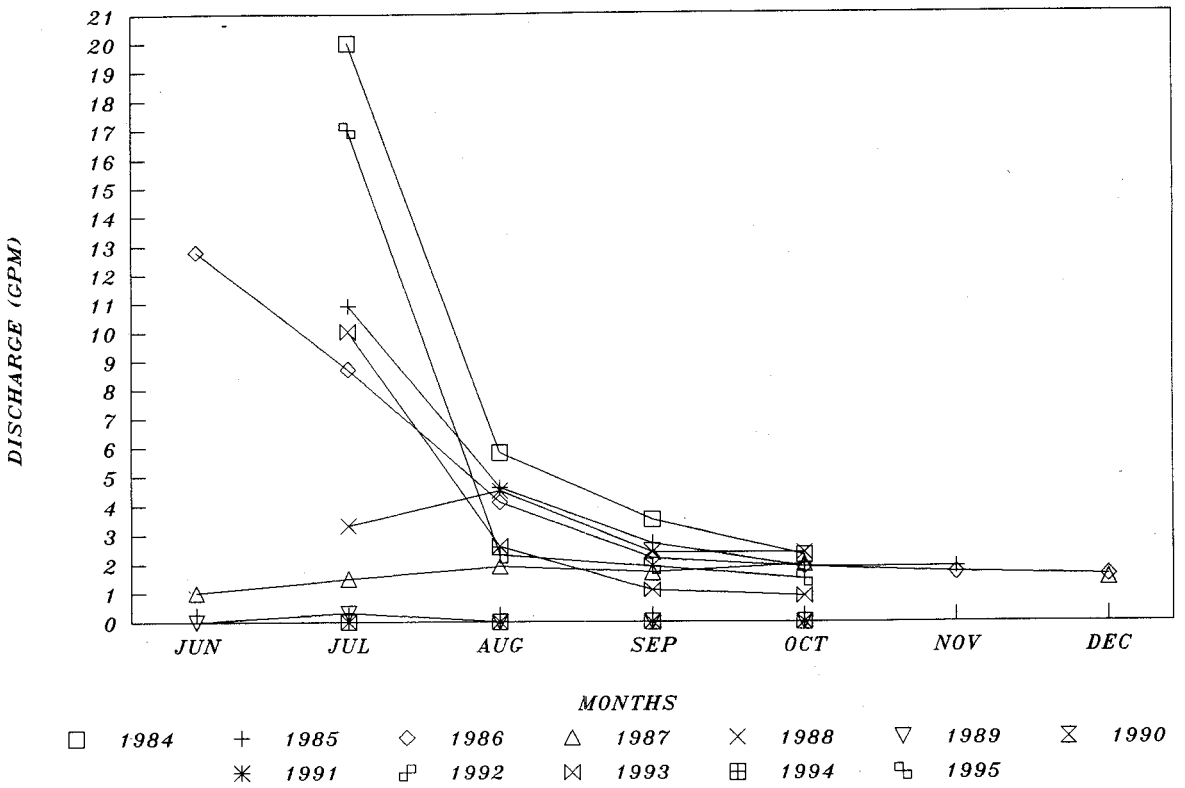
79-23

Discharge Recession Study



79-26

Discharge Recession Study



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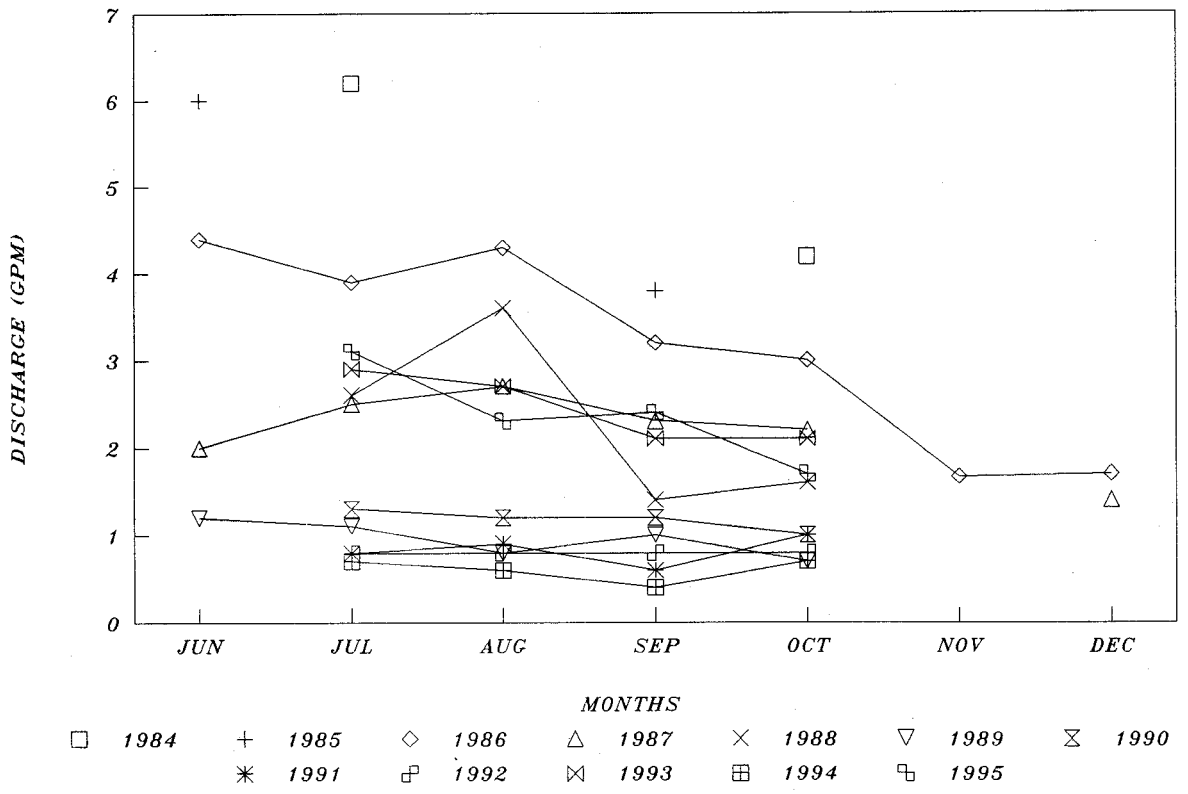
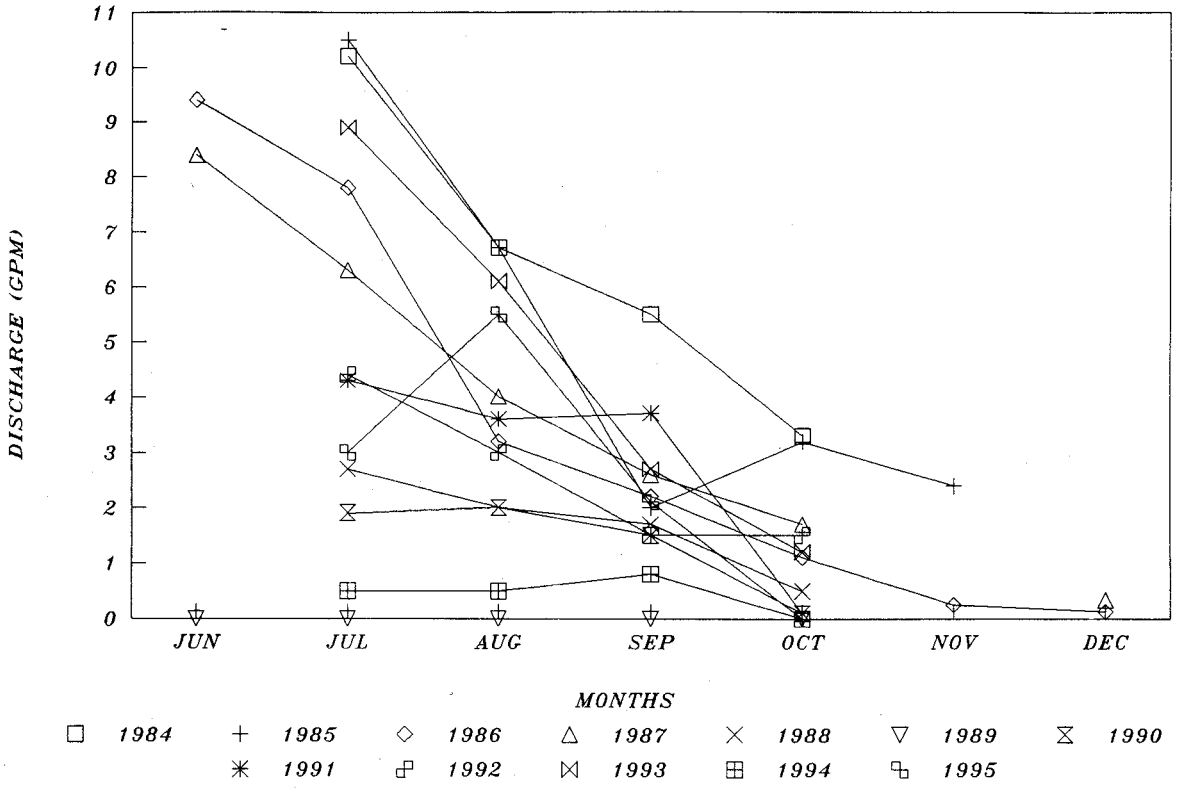
Discharge Recession Study



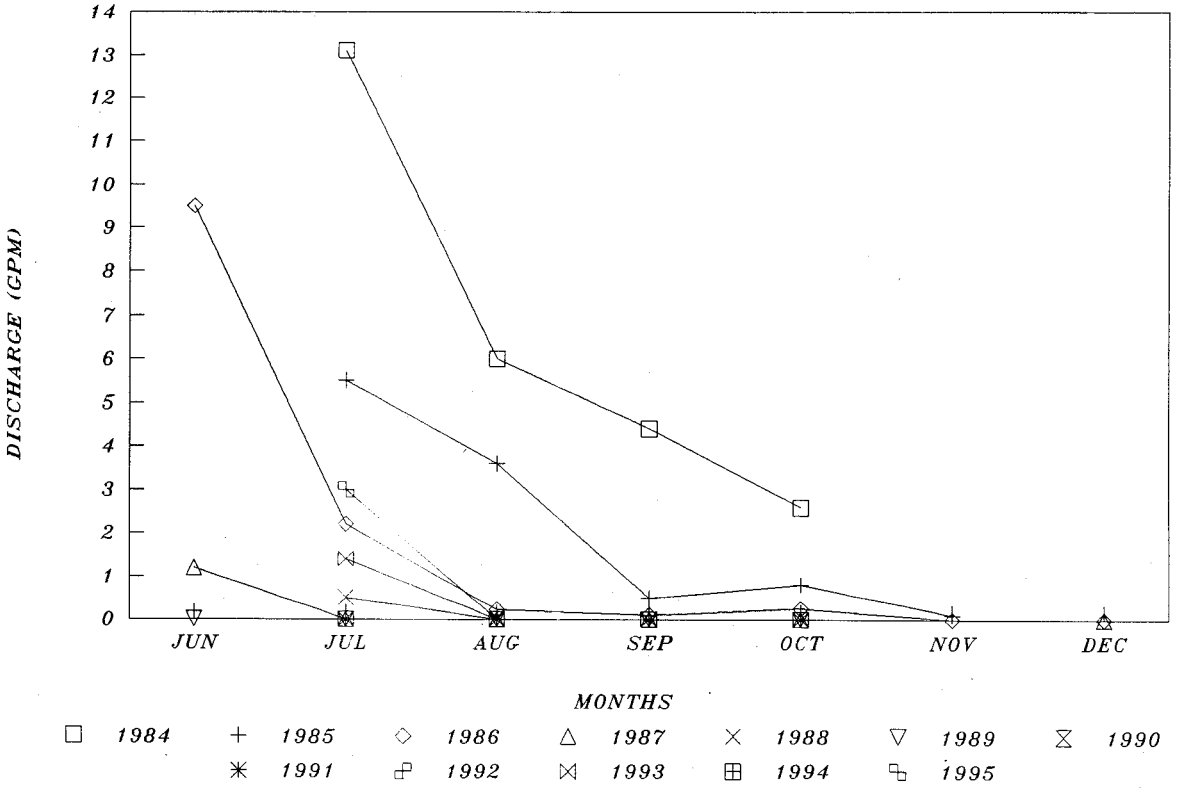
79–35

Discharge Recession Study



80–44

Discharge Recession Study



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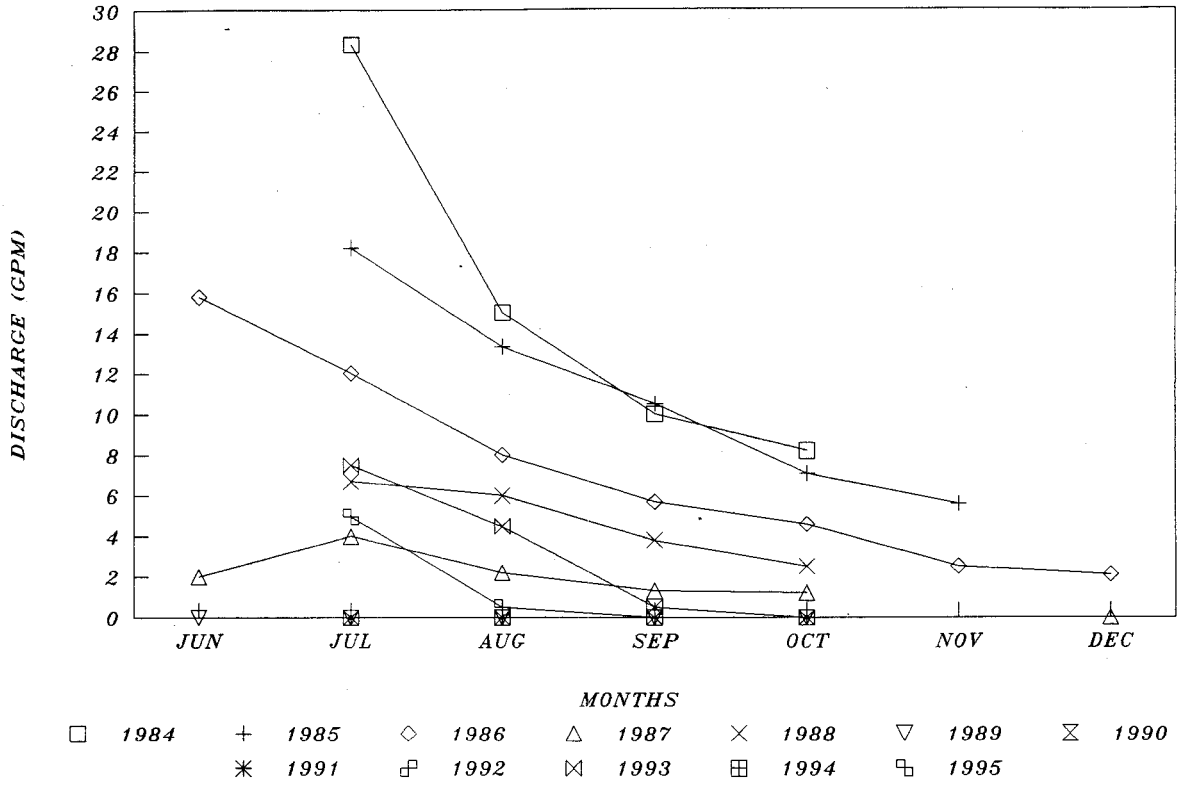
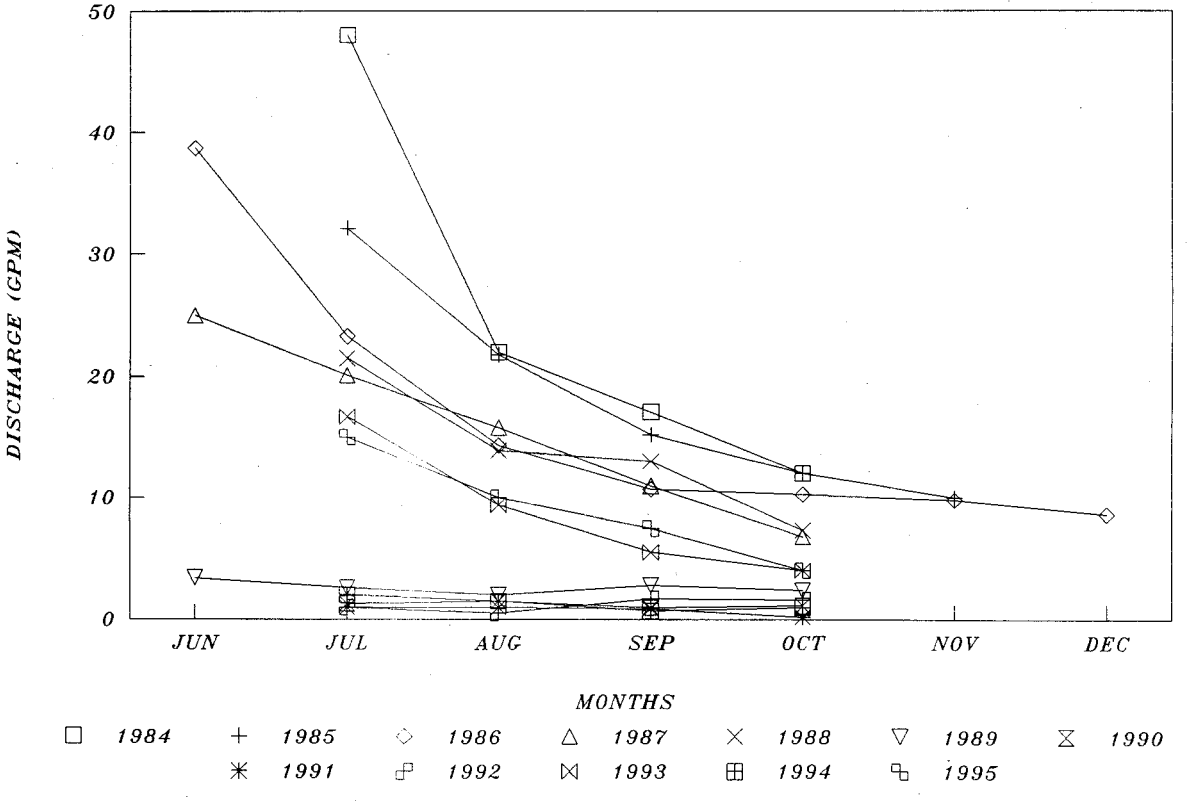
Discharge Recession Study



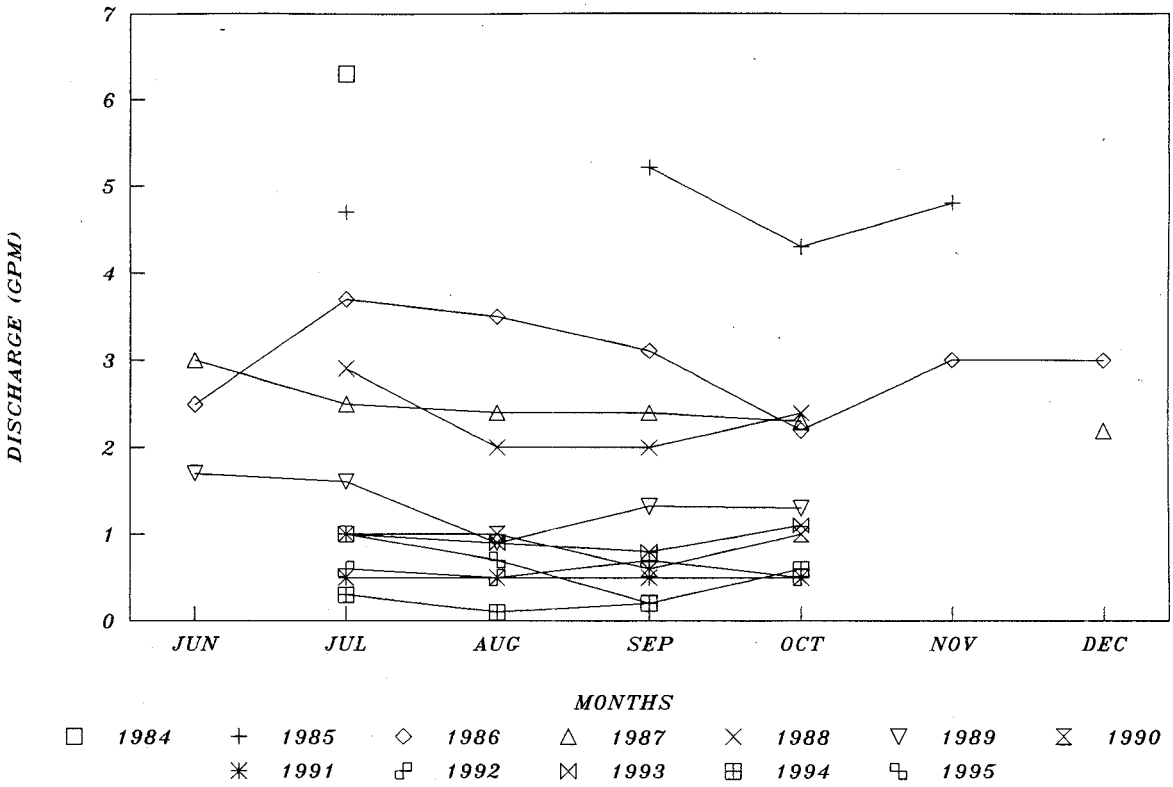
82-52

Discharge Recession Study



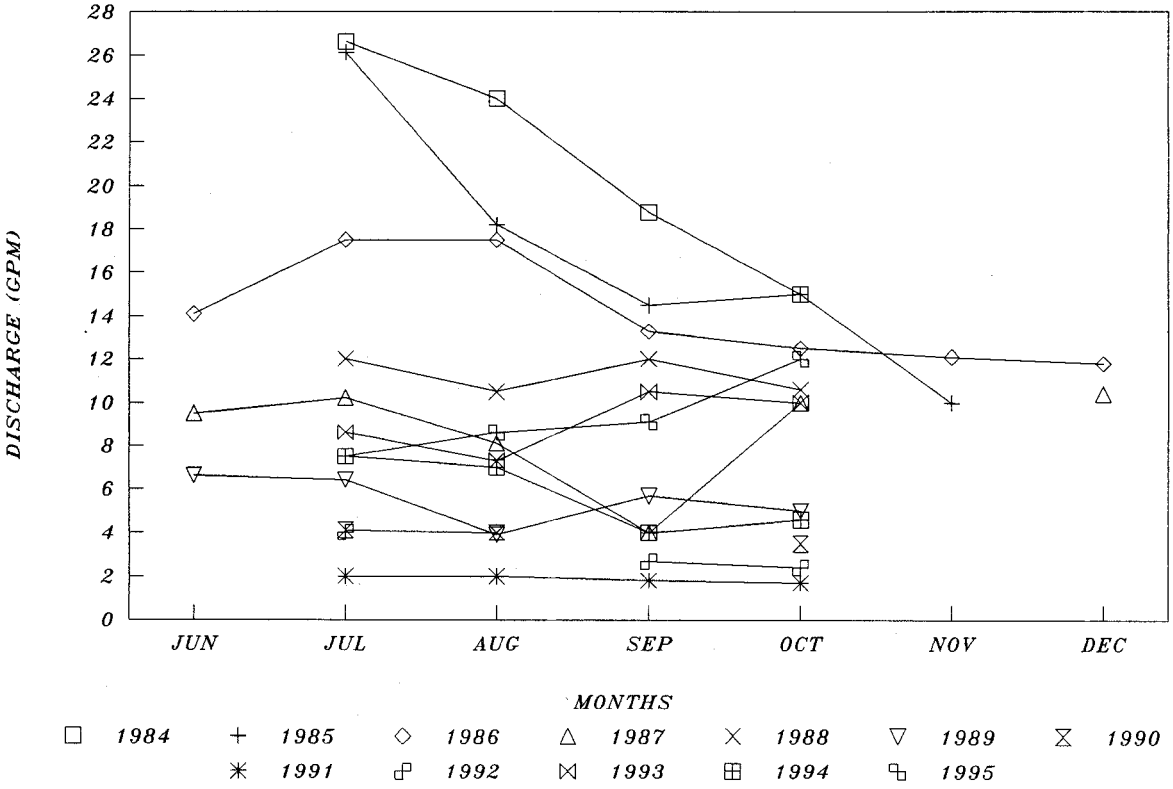
84-56

Discharge Recession Study



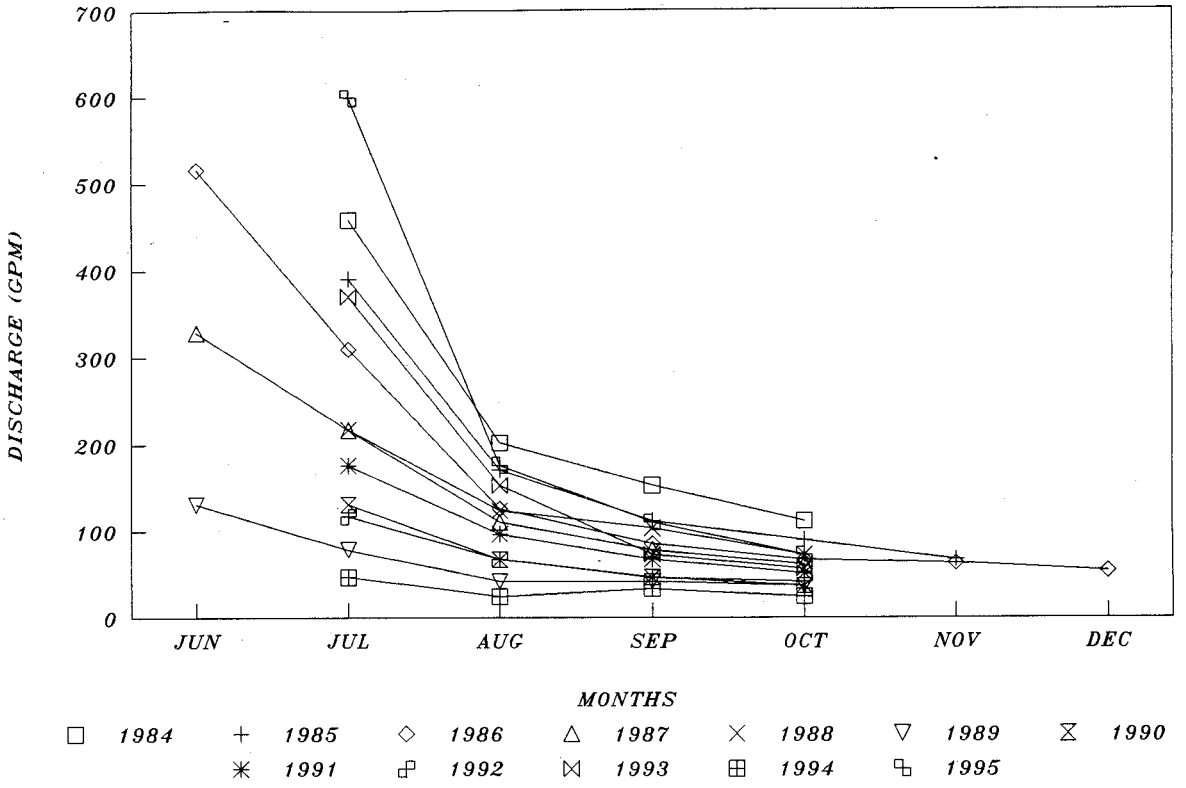
BURNT TREE

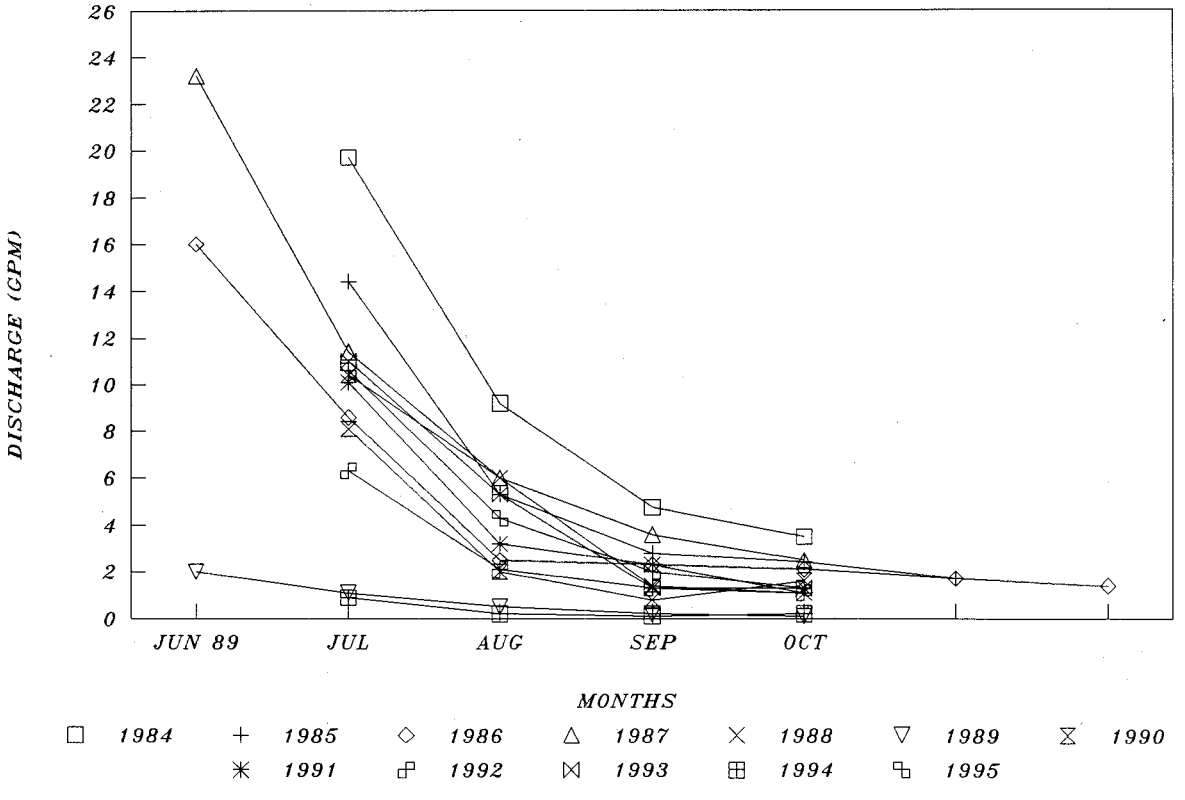
Discharge Recession Study



ELK SPRING

Discharge Recession Study



SHEBA SPRINGS

Discharge Recession Study